NATURAL HERITAGE REFERENCE MANUAL

FOR POLICY 2.3 of the PROVINCIAL POLICY STATEMENT

- Ontario Ministry of Natural Resources -

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NATURAL HERITAGE REFERENCE MANUAL

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List of Acronyms Used in this Manual

ANSI	Area of Natural and Scientific Interest
CLLS	Canadian Lakes Loon Survey
COSEWIC	The Committee on the Status of Endangered Wildlife in Canada
COSSARO	The Committee on the Status of Species-at-Risk in Ontario
CWS	Canadian Wildlife Service
DFO	Department of Fisheries and Oceans
EBR	Environmental Bill of Rights
ELC	Ecological Land Classification
ESA	Environmentally Sensitive Area
FBMP	Forest Bird Monitoring Program
FON	Federation of Ontario Naturalists
FRI	Forest Resource Inventory
LPBO	Long Point Bird Observatory
MBMP	Marsh Bird Monitoring Program
MTO	Ministry of Transportation
NGO	Non-Government Organization
NHIC	Natural Heritage Information Centre
OBAR	Ontario Birds at Risk
OBM	Ontario Base Map

OHS	Ontario Herpetofaunal Survey
OMNDM	Ontario Ministry of Northern Development and Mines
OMNR	Ontario Ministry of Natural Resources
OMOE	Ontario Ministry of the Environment
OMOEE	Ontario Ministry of Environment and Energy
ORBBP	Ontario Rare Breeding Bird Program
PPS	Provincial Policy Statement
RENEW	Recovery of Nationally Endangered Wildlife
ROM	Royal Ontario Museum
SEV	Statement of Environmental Values
UTM	Universal Transverse Mercator
WWF	World Wildlife Fund

1. INTRODUCTION

This document, the Natural Heritage Reference Manual, is a guide for those who require additional information on technical issues relative to the application of Section 2.3 - Natural Heritage of the Provincial Policy Statement (PPS) (Table 1.1). The PPS provides policy direction on matters of provincial interest in municipal land use planning under the Planning Act. Section 3 of the Planning Act requires that planning authorities "shall have regard to" the PPS when exercising any authority that affects a planning matter.

The Natural Heritage Reference Manual is one of a number of documents issued by the Province to assist planning authorities and other participants in the land use planning system. This Reference Manual, developed in consultation with practitioners, represents the most up-to-date information available at the date of publication on specific technical issues relating to the PPS.

The Natural Heritage Reference Manual should not be read in isolation from the PPS and the other support documents. These documents are advisory only and may be updated as technology or techniques improve. They provide information to assist in understanding the policy. They do not add to or derogate from policy. Except as otherwise specified (e.g., where requirements are established by legislation or regulation), they do not represent the only acceptable approaches. There may be many ways to achieve the end results established in the PPS. However, in all cases planning authorities must have regard to the PPS.

This Manual applies to municipalities, planning boards and planning authorities, all of which are referred to as planning authorities from this point forward. Users of this Manual will also include consultants, landowners, land developers, environmental agencies, community-based organizations, non-government organizations (NGOs), interested citizens and the Ontario Municipal Board.

This Manual is intended for use by those who have a basic understanding of the Planning Act requirements and the intent of the PPS, and will be of most interest to those involved in:

- the development and review of policy documents; and
- the review and approval of development applications.

The Natural Heritage Reference Manual does not provide the user with all of the information needed to undertake the detailed technical studies that may be required to deal with a natural heritage planning matter. However, the Manual does provide other information sources that can be consulted. The Manual also provides guidance relative to additional technical information that may be obtained from experts or other sources. In addition, the Manual provides examples of approaches that have been used by planning authorities in dealing with natural heritage planning matters.

Table 1.1: Natural Heritage Component of the Provincial Policy Statement

2.3 Natural Heritage

2.3.1 Natural heritage features and areas will be protected from incompatible development.

a) Development and site alteration will not be permitted in:
- *significant wetlands south and east of the Canadian Shield; and*
- *significant portions of the habitat of endangered and threatened species.*

b) Development and site alteration may be permitted in:
- *fish habitat;*
- *significant wetlands in the Canadian Shield;*
- *significant woodlands south and east of the Canadian Shield;*
- *significant valleylands south and east of the Canadian Shield;*
- *significant wildlife habitat; and*
- *significant areas of natural and scientific interest*

if it has been demonstrated that there will be no negative impacts on the natural features or the ecological functions for which the area is identified.

2.3.2 Development and site alteration may be permitted on adjacent lands to a) and b) if it has been demonstrated that there will be no negative impacts on the natural features or on the ecological functions for which the area is identified.

2.3.3 The diversity of natural features in an area, and the natural connections between them should be maintained, and improved where possible.

2.3.4 Nothing in policy 2.3 is intended to limit the ability of agricultural uses to continue.

Development:

means the creation of a new lot, a change in land use, or the construction of buildings and structures, requiring approval under the Planning Act; but does not include activities that create or maintain infrastructure authorized under an environmental assessment process; or works subject to the Drainage Act.

Site Alteration:

Means activities, such as fill, grading and excavation, that would change the landform and natural vegetative characteristics of a site.
(Provincial Policy Statement Definitions)

This Manual deals with matters of provincial interest. Planning authorities may choose to go *beyond the minimum standards established in specific policies, in developing official plan policies and when making decisions on planning matters, unless doing so would conflict with any other policy* (PPS, Section IV - Implementation). This option of going beyond the minimum standards includes those features whose significance has been defined by the province. For

example, a planning authority may choose to include regionally significant areas of natural and scientific interest (ANSIs) as being significant in their planning policies, in addition to those that have been designated as provincially significant by the Ontario Ministry of Natural Resources (OMNR). Planning authorities may also choose to include environmentally significant or sensitive areas (ESA's) and/or wetlands, as identified by local conservation authorities or the planning authority itself in their planning documents.

This Manual is intended for use in policy development and applications and approvals. This Manual deals with matters specific to approvals under the Planning Act. However, the Manual may also be useful in considering applications that must fulfill other approval processes (e.g., Class Environmental Assessments). In cases where planning applications are also subject to the requirements of other legislation (e.g., *Fisheries Act*), appropriate references are noted in the text (see Section 2).

Natural heritage planning should be a community-based activity involving residents, landowners, community groups (i.e., naturalist clubs), local environmental agencies (i.e., conservation authorities and OMNR local offices) all working cooperatively with the planning authority to identify and protect the significant natural heritage features and areas.

Planning authorities may establish advisory groups to provide advice on broad environmental issues, and assist in the identification of natural heritage features and areas.

The Manual consists of seven sections:

- Section 1 - Introduction;
- Section 2 - Natural Heritage Features and Areas;
- Section 3 - The Natural Heritage System Approach;
- Section 4 - Addressing Natural Heritage Features and Areas in Policy Documents;
- Section 5 - Addressing Impacts of Development on Natural Heritage Features and Areas
- Section 6 - Performance Indicators; and
- Section 7 - References.

Section 2 describes each of the natural heritage features and areas identified in Policy 2.3 of the PPS (see Sections 2.2 to 2.8). Benefits and values and identification and evaluation procedures are suggested for each natural heritage feature or area, along with information sources that the reader may consult for more detailed information. Sections 2.2 to 2.8 provide information on factors to be considered in defining adjacent land widths and include recommended distances for adjacent land widths. These sections also outline the concept of significance relative to a natural heritage feature or area. This information is useful in determining whether a development proposal may have a negative impact on a natural heritage feature or area.

Section 3 outlines an approach that planning authorities may choose in developing natural heritage systems. Development of a natural heritage system is offered as a comprehensive approach to defining natural heritage features and areas cited in Section 2.3.1 of the PPS, and to addressing Section 2.3.3 of the PPS which recognizes that ***the diversity of natural features in an area, and the natural connections between them should be maintained, and improved where possible.*** Section 3 also includes references on greenspace, natural areas and watershed studies.

Section 4 outlines suggestions for planning authorities regarding the incorporation of provisions for the protection of natural heritage features and areas in their Official Plans and Zoning By-laws.

Section 5 provides a guide to undertaking an assessment of potential impacts of development and site alteration on natural heritage features and areas. An example impact assessment process is provided.

Section 6 provides general information on performance indicators, relative to the protection of natural heritage features and areas, while Section 7 provides references that may be consulted for further technical information and advice.

Additional detailed information is provided in a series of appendices. The information in these appendices represents the current state of science and examples of current approaches. These approaches may change with future scientific advances. In addition, planning authorities may choose to adopt other approaches provided that they have regard to the PPS They may also establish advisory groups to provide advice on broad environmental issues, as well as assisting in the identification and evaluation of natural heritage features and areas.

OMNR's Strategic Directions and Its Statement of Environmental Values

The OMNR is responsible for managing Ontario's natural resources in accordance with the statutes it administers. As the province's lead conservation agency, the OMNR is steward of provincial parks, natural heritage areas, forests, fisheries, wildlife, mineral, aggregates, fuel minerals, and crown lands and water, which make up 87 per cent of Ontario.

In 1991 the OMNR released a document, MNR: Directions '90s, which outlines the goals and objectives of the Ministry, which are based on the concept of sustainable development, as expressed by the World Commission on Environment and Development. Within OMNR, policy and program development take their lead from Direction'90s. Those strategic directions are also considered in Ministry land use and resources management planning.

In 1994, the Ministry finalized its Statement of Environmental Values (SEV) under the Environmental Bill of Rights (EBR). The Statement of Environmental Values is a document which describes how the purposes of the EBR are to be considered by OMNR whenever decisions that might significantly affect the environment are made.

The Ministry's SEV is based on MNR: Direction 90's. The Ministry has taken this approach to its SEV because the strategic directions outlined in MNR: Direction '90s reflect the purposes of the EBR. During the development of this manual, the Ministry has considered both MNR: Direction '90s and its SEV. This manual is intended to reflect the directions set out in those documents and to further the objective of managing resources on a sustainable basis.

2. NATURAL HERITAGE FEATURES AND AREAS

2.1 INTRODUCTION

> ***Natural heritage features and areas:***
>
> ***means features and areas, such as significant wetlands, fish habitat, significant woodlands south and east of the Canadian Shield, significant valleylands south and east of the Canadian Shield, significant portions of habitat of endangered and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area.*** (Provincial Policy Statement Definition)

Sections 2.2 to 2.8 describe each of the natural heritage features and areas identified in Policy 2.3 of the Provincial Policy Statement (PPS). These natural heritage features and areas are:

- significant wetlands (see Section 2.2);
- significant portions of the habitat of endangered and threatened species (see Section 2.3);
- fish habitat (see Section 2.4);
- significant woodlands (see Section 2.5);
- significant valleylands (see Section 2.6);
- significant wildlife habitat (see Section 2.7); and
- significant areas of natural and scientific interest (ANSIs) (see Section 2.8).

Background information, including the definitions from the PPS and an overview of benefits and values, is provided for each natural heritage feature and area. In addition, a summary of recommended identification and evaluation procedures is provided. Recommendations for adjacent lands are also provided, along with information sources for each natural heritage feature and area. The suggested information sources are not intended to be comprehensive. It is expected that other information sources may have to be consulted for further detailed information on a particular natural heritage feature or area.

The concept of significance is central to the identification of all natural heritage features and areas, except fish habitat. In the case of wetlands and ANSIs, the responsibility for identifying significance lies with the Ontario Ministry of Natural Resources (OMNR). OMNR will also identify significant portions of the habitat of endangered species. In all other cases the responsibility lies with the planning authority and with those agencies or advisors that the planning authority may wish to involve in the evaluation of natural heritage features and areas.

Significant means:

- ***in regard to wetlands and areas of natural and scientific interest, an area identified as provincially significant by the Ministry of Natural Resources using evaluation procedures established by the province, as amended from time to time.***

- ***in regard to other features and areas in policy 2.3, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system. Criteria for determining significance may be recommended by the Province, but municipal approaches that achieve the same objective may also be used.***
  (Provincial Policy Statement Definition)

The identification and evaluation of ***significant*** features and areas is important both to the development of planning documents and to the assessment of possible impacts of proposed development or site alteration ***on the natural features or the ecological functions for which the area is identified***.

The concept of adjacent land is also important and is defined as follows:

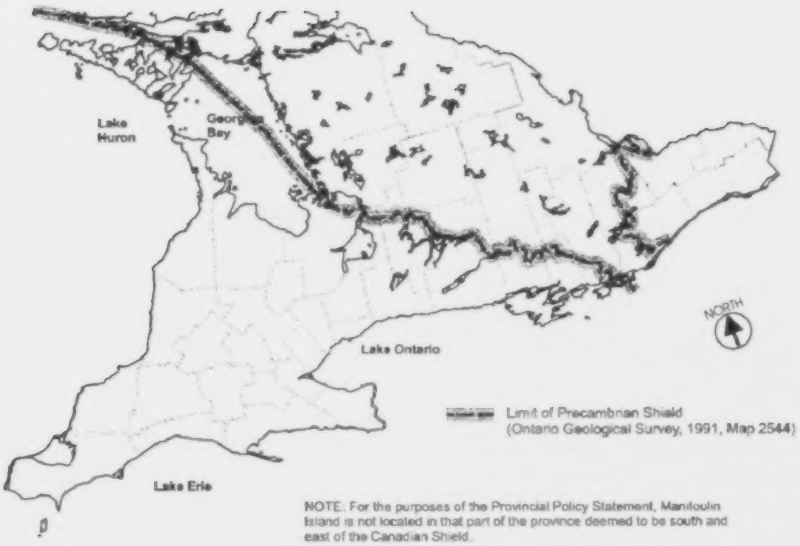
Adjacent lands:

means those lands, contiguous to a specific natural heritage feature or area, where it is likely that development or site alteration would have a negative impact on the feature or area. The extent of the adjacent lands may be recommended by the Province or based on municipal approaches which achieve the same objectives.
(Provincial Policy Statement Definition)

Adjacent lands are the lands within which impacts must be considered and within which the compatibility of a development proposal must be addressed. The extent of adjacent lands is based on information on the effectiveness of setbacks, landforms and sustainable natural vegetation in preventing or mitigating any negative impacts that might be expected to occur adjacent to a feature or area. Important considerations in recommending the extent of adjacent lands are provided in sections 2.2(c) to 2.8(c). Adjacent lands are not synonymous with buffer areas, nor are they necessarily no-development zones. Impact assessments, however, may recommend mitigation measures such as the establishment of vegetated buffers.

Figure 2.1 depicts the line used to identify lands situated south and east of the Canadian Shield. According to the PPS, lands to the south and east of the Canadian Shield ***means lands lying south and east of the southern boundary of the Precambrian Shield, excluding Manitoulin Island***. The Canadian Shield line applies to significant wetlands, woodlands and valleylands. For wetlands, it marks the boundary between the lands (south and east of the Shield) subject to the "no development policy", and those subject to the "conditional development policy". The PPS policies on **significant woodlands and significant valleylands** apply to the natural heritage

FIGURE 2.1. South and East of the Canadian Shield.


Lake Huron
Georgian Bay
Lake Ontario
Lake Erie
NORTH
Limit of Precambrian Shield
(Ontario Geological Survey, 1991, Map 2544)
NOTE: For the purposes of the Provincial Policy Statement, Manitoulin Island is not located in that part of the province deemed to be south and east of the Canadian Shield.

areas situated south and east of the Canadian Shield. However, planning authorities north of the Canadian Shield boundary may still choose to develop policies which protect these natural heritage features and areas.

A planning authority may have to determine the exact location of this line. In cases where the line bisects a natural heritage area, the province supports the application of the policy which applies south and east of the Canadian Shield. Detailed mapping (i.e., 1:10,000 OBM base) of this line is available in digital format from the Ontario Ministry of Natural Resources (OMNR). Paper copies of the digitized maps are also available.

2.2 SIGNIFICANT WETLANDS

(a) Background

> ***Wetlands mean lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens.***
>
> ***Periodically soaked or wet lands being used for agricultural purposes which no longer exhibit wetland characteristics are not considered to be wetlands for the purposes of this definition.*** (Provincial Policy Statement Definition)

A significant wetland is:

> ***an area identified as provincially significant by the Ministry of Natural Resources using evaluation procedures established by the province, as amended from time to time.*** (Provincial Policy Statement Definition)

The PPS treats wetlands differently, depending on whether they are located south and east of the Canadian Shield or in the Canadian Shield (Figure 2.1).

Wetlands are habitats forming the interface between aquatic and terrestrial systems. The ecological, social and economic benefits that can be ascribed to wetlands are substantial. They are among the most productive and biologically diverse habitats in Ontario. By protecting wetlands, we contribute to the protection of plant and animal species, and to the protection of surface water and groundwater resources. Since the time of European settlement, more than 70 % of the wetlands in southern Ontario have been lost through encroachment, land clearance, drainage and filling. Wetland losses have also occurred in northern Ontario, particularly near urban centres, along the Great Lakes shoreline and along other lakes and rivers.

Wetlands perform a number of important functions, including:

- the recharge and discharge of groundwater, ensuring a stable, long-term supply;
- flood damage reduction through the control and storage of surface water;
- corridors for the movement of species between habitats;

- recreational and tourism opportunities (e.g., hunting, fishing, bird watching, hiking, boating);
- renewable harvesting for timber, fuelwood, fish, wildlife and wild rice;
- the provision of habitat for a wide variety of plant and wildlife species, including migrating waterfowl, shorebirds and songbirds;
- stabilization of shorelines and erosion damage reduction; and
- water quality improvement through the trapping of sediments, the removal and/or retention of excess nutrients, the immobilization and/or degradation of contaminants, and the removal of bacteria.

(b) Identification and Evaluation

The OMNR is responsible for determining which wetlands and wetland complexes (groups of individual wetland units which are functionally related in some important manner) are provincially significant, on the basis of evaluation procedures established by the Province, as amended from time to time. At present, the Ontario Wetland Evaluation System (OMNR, 1993a, b) is used in conjunction with provincial scoring criteria to identify provincially significant wetlands and wetland complexes.

Wetlands can also be identified and evaluated by other qualified individuals, provided they use the approved methodology and have received training in the use of the province's wetland evaluation system. In these cases, OMNR is responsible for reviewing and approving the evaluations. The OMNR offers training courses in wetland evaluation from time to time.

The wetland evaluation system includes the Southern Manual, for all southern Ontario wetlands located in Site Regions 6 and 7 as defined by Hills (1961), and the Northern Manual for the remainder of the province including Site Regions 2 to 5 as defined by Hills (1961).

The wetland evaluation system does not produce a detailed biophysical inventory of each wetland. Rather, it assists trained evaluators in ranking the relative importance of different wetlands based on a numerical ranking of wetland values or functions which are grouped as follows:

Biological	**Social**	**Hydrological**	**Special Features**
• productivity • biodiversity • size	• economic products • recreational activities • landscape aesthetics • etc.	• flood attenuation • water quality • ground water recharge • etc.	• significant features • significant habitats • ecosystem and species rarity • ecosystem age

Wetlands evaluated under version 2 of the Southern Ontario Wetland Evaluation Manual (March 1984) were placed into one of seven classes with Class 1, 2 and 3 wetlands considered to be provincially significant. The current version of the Southern Ontario Wetland Evaluation

Manual (March 1993, Revised May 1994) does not categorize wetlands by class. Based on their score, wetlands are considered to be either provincially significant or not. Non-provincially significant wetlands may, however, be considered regionally or locally significant within the planning area in which they occur, provided that the planning authority has a rationale for such a designation.

A wetland evaluation can be applied either to an individual wetland or to wetland complexes. The rules for wetland complexes are identified in the Wetland Evaluation System manuals (OMNR, 1993a,b).

Wetlands are dynamic ecosystems which can change over time, due to factors such as natural succession and changing water levels. Although the main character of a wetland is generally quite stable, outer boundaries can change and boundary verification or re-evaluation may be necessary from time to time. In these situations, OMNR wetland evaluation files can be updated to reflect current conditions.

(c) Adjacent Lands

Adjacent lands are the lands within which impacts must be considered and within which the compatibility of a development proposal must be addressed. The extent of adjacent lands may vary depending on such factors as topography, soil types, hydrological connectivity, adjacent land uses and other features. Planning authorities may define adjacent lands using a variety of approaches depending on site-specific conditions. In all cases, these approaches should be justified relative to the overall objective of protecting wetlands from incompatible development.

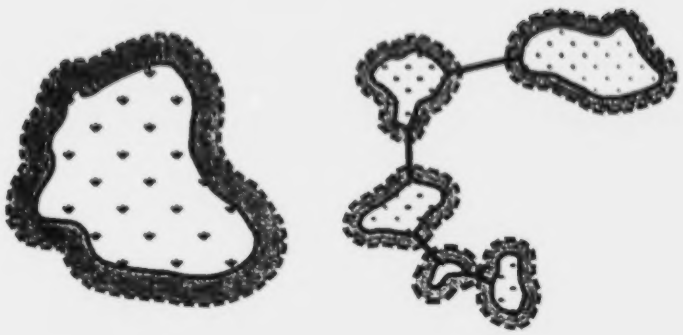
The Province recommends that adjacent lands are those lands within 120 metres of individual significant wetlands or, in the case of wetland complexes, within 120 metres of individual wetlands comprising the complex (see Figure 2.2). This recommended adjacent land width was chosen because it is known that developments within 120 metres of wetlands have a reasonable probability of affecting the ecological functions of the wetlands which they surround, and because wetland species are often dependent on adjacent lands for activities such as nesting, resting, feeding or shelter. Site-specific evaluations based on the considerations noted above may demonstrate the need for greater or lesser distances for adjacent land widths.

(d) Information Sources

Local OMNR offices should be consulted for further information on specific wetlands. The OMNR is responsible for: maintaining the Ontario Wetlands Evaluation System and for revising the manuals, as required; conducting evaluations; validating evaluations done by others; and determining which wetlands are provincially significant. The Ministry also offers wetland evaluation system training courses from time to time and maintains wetland evaluation files.

Wetland evaluation system manuals for Southern Ontario and Northern Ontario are available from the Wetlands Research Centre, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, N2L 3G1 (Telephone: 519-885-1211, extension 5244). There is a fee charged for the manuals.

FIGURE 2.2 Adjacent Lands - Wetlands



2.3 SIGNIFICANT PORTIONS OF THE HABITAT OF ENDANGERED AND THREATENED SPECIES

(a) Background

Endangered species means any native species, as listed in the Regulations under the Endangered Species Act, that is at risk of extinction throughout all or a significant portion of its Ontario range if the limiting factors are not reversed.

Threatened species means any native species that is at risk of becoming endangered through all or a portion of its Ontario range if the limiting factors are not reversed. (Provincial Policy Statement Definitions)

The protection of endangered and threatened species and their habitats is necessary in order to slow or prevent the extirpation (loss) of species from the province, and, in some cases, to help prevent their extinction on a global basis. At the time of writing, a number of species have been listed in regulation under Ontario's *Endangered Species Act*. A number of other species have been identified as threatened by OMNR and/or as endangered or threatened by the national Committee on the Status of Endangered Wildlife in Canada (COSEWIC).
For the purposes of the application of the PPS, it is recommended that those species identified by COSEWIC as endangered and which are not listed in regulation under the *Endangered Species Act* be treated as a threatened species, as defined in the PPS.

The federal Fisheries Act protects all fish habitat. Information on the protection of fish habitat, including the habitat of endangered and threatened fish species, is provided in Section 2.4.

(b) Identification and Evaluation

The OMNR is responsible for the identification, evaluation and listing of provincially endangered or threatened species. Planning authorities may wish to have assessments of the significant portions of the habitat of threatened species reviewed by OMNR staff.

The protection of threatened and endangered species requires that significant portions of their habitat be protected. As the habitat requirements of individual threatened or endangered species are extremely varied, the assessment of what constitutes the significant portions of the habitat must be made on a species-by-species and case-by-case basis. The ***significant portions of the habitat*** refers to the habitat that is necessary for the survival of populations of endangered and threatened species.

The amount of habitat required for the survival of an endangered or threatened species is normally determined on a case-by-case basis either:

- by applying the information in species-specific status reports or recovery plans or management guidelines, where they exist; or

- on the basis of expert biological advice where such plans or guidelines do not exist. Even where such plans and guidelines are available, expert biological advice will often be required to apply the information at a site level.

The formation of recovery teams and approval of recovery plans and other management guidelines or plans for threatened and endangered species is the responsibility of the OMNR and/or other government agencies with responsibility for the management of the species in question. A recovery plan is a specialized type of management plan that recommends options for protecting, enhancing, stabilizing or increasing the size of populations and habitats of endangered or threatened species, and identifies how management prescriptions should be implemented.

Recovery plans and management guidelines provide the most comprehensive information available on the habitat requirements of species at risk. In the case of species with very few occurrences, recovery plans may also identify, in detail, the habitat to be protected at a particular site. For species with a larger number of occurrences, recovery plans may discuss habitat requirements in more general terms, necessitating on-site interpretation and application by an expert. For example, a recovery plan may specify that a buffer of a particular width be placed around an occurrence. However, the precise configuration of the buffer should be determined by an individual with expert knowledge of the requirements of the species, taking into consideration local topographic features and other factors.

The degree of complexity in identifying the significant portions of the habitat will vary considerably from species to species. In the case of wide-ranging, highly mobile or migratory species of wildlife, identification of the significant portions of the habitat is a complex task and entails more than simply placing a buffer around a breeding site. Maintenance or enhancement of such populations may require protecting associated feeding and foraging areas, roosts, migration routes and stopover areas, overwintering sites or hibernacula, areas for the dispersal of

young and areas important to various stages of the species' life cycle or cycle of seasonal activities. Recovery plans for such species typically deal with the special circumstances inherent in identifying and protecting the species.

Attachment A.1 provides a Recommended Approach for the Identification of the Significant Portions of the Habitat of Endangered and Threatened Species.

(c) Adjacent Lands

Adjacent lands are the lands within which impacts must be considered and within which the compatibility of a development proposal must be addressed. Development on lands adjacent to significant portions of the habitat of endangered and threatened species may impact the natural features or ecological functions for which the area is identified, specifically the habitat requirements of the identified species. Planning authorities may define adjacent lands using a variety of approaches depending on site-specific conditions. In all cases, these approaches should meet the overall objective of protecting significant portions of the habitat of endangered and threatened species from incompatible development.

The Province recommends that adjacent lands are those lands within 50 metres of the significant portions of the habitat of endangered or threatened species (see Figure 2.3). The recommended adjacent land width is intended to ensure that those developments that are reasonably likely to impact the habitat of a threatened or endangered species are flagged during the development application process. Site-specific evaluations based on the considerations noted above may demonstrate the need for greater or lesser distances for adjacent land widths.

d) Information Sources

Planning authorities may obtain copies of nationally approved recovery plans or status reports from the COSEWIC/RENEW (Recovery of Nationally Endangered Wildlife) Secretariat of Environment Canada or from the Committee on the Status of Species-at-Risk in Ontario (COSSARO). In some cases, OMNR local offices may also have copies of these plans. Management guidelines, copies of the current list of Vulnerable, Threatened, Endangered, Extirpated or Extinct Species of Ontario, and a list of recovery plans, are available from OMNR local offices.

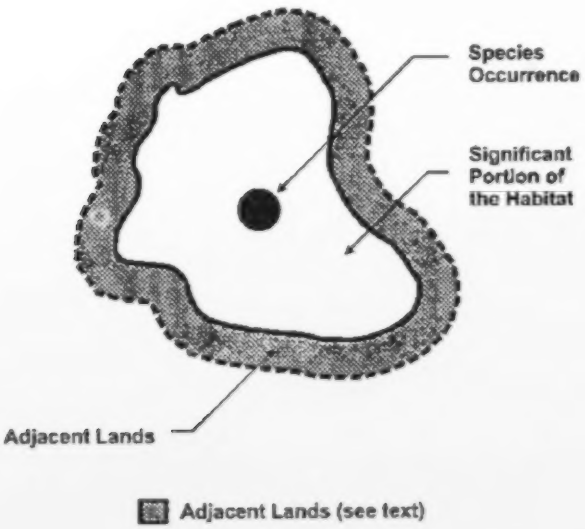
Information on the specific locations of endangered or threatened species is sensitive because the misuse of this information may contribute to the risk already associated with these species. This detailed location information is available from OMNR on a need-to-know basis.

Information that is routinely available includes lists of species and status reports. Management guidelines and recovery plans are available for some listed species. In addition, maps identifying the generalized locations of species at risk are available from OMNR for planning purposes (please note that these maps do not indicate the individual species at risk). Some of this information and mapping is being computerized. Expert advice is needed to determine the extent of ***significant portions of the habitat***.

The most up to date information on Ontario's endangered and threatened species can be found on the OMNR web site (http://www.mnr.gov.on.ca/MNR/fwmenu.html). From this site, the official list of Vulnerable, Threatened, Endangered, Extirpated or Extinct Species of Ontario (the "VTEEE" list) can be accessed and downloaded. As well, another link to the joint OMNR-Royal Ontario Museum web site provides general information on threatened and endangered species (and other species at risk). This site includes general species accounts, scientific names, status,

distribution, range maps, protection, references and pictures. A final link at the OMNR site to the Natural Heritage Information Centre gives species lists for rare plants and animals in Ontario, as well as global and provincial ranks. Paper copies of the current list of vulnerable, threatened and endangered species (the VTEEE list), or a brochure produced by the Federation of Ontario Naturalists summarizing the list, are available at OMNR District offices.

FIGURE 2.3 Adjacent Lands - Endangered and Threatened Species.



2.4 FISH HABITAT

(a) Background

> ***Fish habitat means the spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes.***
>
> ***Fish mean fish, shellfish, crustaceans and marine animals, at all stages of their life cycles.*** (Provincial Policy Statement Definitions)

Lakes, rivers, streams, ponds and many wetlands provide fish habitat. Intermittent streams and seasonally flooded areas can provide important habitat for some fish species at certain times of the year. In addition, in-water structures such as logs and stumps, pools and riffle areas, riparian and aquatic vegetation and ground water recharge/discharge areas provide habitat. Habitat includes the watercourses that act as corridors allowing fish to move from one area to another. Fish habitat provides food and cover and conditions for successful reproduction. Different species have different habitat requirements which can vary with the life stage, season and even the time of day.

Fish and their habitats are a vital component of natural ecosystems. Fish habitat commonly occurs in many of the other natural heritage areas (e.g., wetlands, valleylands, woodlands, ANSIs). It therefore contributes to the value of the other areas and is influenced by the protection they are provided through the planning process. Fish also provide important social and economic benefits. For example, angling is an important leisure activity that contributes substantially to the tourism industry. Fish depend on clean water, ground water discharge areas and other elements of healthy aquatic ecosystems.

The federal *Fisheries Act* requires that fish habitat be protected. Under the *Fisheries Act*, any activity is considered harmful if it reduces the productive capacity of the habitat, that is, if it reduces the ability of the habitat to provide the life requirements of fish. The "no net loss of productive capacity" principle stems from the Department of Fisheries and Oceans (DFO) Policy for the Management of Fish Habitat (DFO, 1986). The overall objective of the DFO policy is a net gain of productive capacity of fish habitats. The first priority of the DFO policy is habitat conservation. However, the "no net loss" principle allows development to proceed, in some situations, where harmful alteration, disruption or destruction of fish habitat cannot be avoided if compensation is provided for the loss of fish habitat through replacement of natural habitat or through increasing the productivity of existing fish habitat. Such compensation plans must be approved by DFO.

The PPS is consistent with the federal *Fisheries Act* in that it provides protection for all fish habitat, including that of endangered and threatened fish species.

(b) Identification and Evaluation

Habitat information is needed at both broad and detailed scales in order to consider fish habitat issues. For example, it is recommended that fish habitat be identified at a broad level across the

planning area, ideally as part of a watershed study or comprehensive inventory of natural heritage features. For plan review purposes, both broad scale and detailed habitat information is needed to ensure a specific development application does not negatively impact fish habitat.

In many areas of the province the OMNR has identified fish habitat (classified as Type 1, 2, 3) and has mapped available information at a broad or detailed scale. The broad scale maps identify waterbodies and fish communities across the landscape while the detailed maps identify habitats such as spawning and nursery areas. DFO (1998) now classifies habitat as:

- **Critical** habitats (formerly Type 1) are those which have high productive capacity, are rare, highly sensitive to development, or have a critical role in sustaining fisheries (e.g , spawning and nursery areas for some species, and ground water discharge areas).

- **Important** habitats (formerly Type 2) are moderately sensitive to development and, although important to the fish population, are not considered critical (e.g., feeding areas and open water habitats of lakes).

- **Marginal** habitats (formerly Type 3) have low productive capacity or are highly degraded, and do not currently contribute directly to fish productivity. They often have the potential to be improved significantly (e.g., a portion of a waterbody, such as a channelized stream, that has been highly altered physically).

The OMNR supports this habitat typing, which can be used to help determine the appropriate level of fish habitat protection. For example, critical habitats require the highest level of protection because of their sensitivity or their importance to local fish populations. DFO will generally not authorize the harmful alteration, disruption or destruction of critical habitats (see Background, above). However, authorization, with compensation, is an option for important and marginal habitats. Marginal habitats have low productive capacity or are highly degraded, but may offer significant opportunities for improvement or rehabilitation.

The information available to evaluate habitat is often general in nature and may be limited to a list of fish species present in the waterbody, the location of the waterbody within the drainage system (e.g., headwater areas) and adjacent land use characteristics. This information can help to determine the probable character and value of fish habitats in the area, their sensitivity to the potential effects of the proposed development and protection requirements. Attachment A.2 describes how these characteristics can be used to evaluate habitat at a broad scale. One such broad scale measure is lake capacity modeling. The Ontario Ministry of the Environment (OMOE) has developed a model to evaluate lakeshore development capacity limits, based on a number of parameters. For lake trout lakes, the level of dissolved oxygen is the most critical parameter, given that it is crucial to lake trout survival. The OMOE's lakeshore capacity assessments include dissolved oxygen as a criterion, and provide the scientific rationale for establishing development control policies in municipal Official Plans or other broad scale planning documents.

The review of specific development proposals often involves more detailed habitat evaluations. Potential negative impacts are dictated by the kind of development, its magnitude, its proximity to fish habitats and the nature of local fish habitats themselves. A number of characteristics can be used to provide more detailed evaluations of habitat, including habitat functions (e.g.,

spawning, rearing), current and potential contribution to fish productivity, and sensitivity to development.

For example, it is important to ensure that habitat for all life requirements of endangered and threatened species is protected. In these instances, scientific status reports and recovery plans should be consulted to determine the specific life history requirements, known occurrences and habitats that require protection. Attachment A.3 provides information on the evaluation of fish habitat at a detailed scale.

Guidelines for describing habitat characteristics of lakes and streams (e.g., coldwater, coolwater, warmwater, permanent, intermittent, spawning habitat) have been prepared (OMNR, 1998a).

(c) Adjacent Lands

Adjacent lands are the lands within which impacts must be considered and within which the compatibility of a development proposal must be addressed. The extent of adjacent lands on which development or site alteration may affect fish habitat depends on numerous factors including the nature of development or site alterations, the sensitivity of fish habitat potentially affected and local site conditions (e.g., vegetative cover, slope, soils). Planning authorities may define adjacent lands using a variety of approaches depending on site-specific conditions. In all cases, these approaches should meet the overall objective of protecting fish habitat from incompatible development. In addition, planning authorities should recognize that a single specific width of adjacent land may not be adequate to address potential impacts on fish habitat for all planning applications.

Adjacent lands should generally be measured from the seasonal high water mark. In some situations, fish habitat is located on land that may be dry for much of the year. For example, northern pike may spawn in areas flooded during the spring. In such cases, it may be necessary to measure adjacent lands from the landward extent of the habitat (Figure 2.4). Since fish habitat may depend on groundwater recharge areas, these areas should be included within adjacent lands, particularly where they occur near lakes and streams. The boundaries of upland recharge areas, which may be very large and a considerable distance from the water body, need not normally be considered adjacent lands for fish habitat (Figure 2.4). However, under Policy 2.4 of the PPS, planning authorities may identify and manage these recharge areas as part of the regional recharge system.

2.4 Water Quality and Quantity

2.4.1 The quality and quantity of ground water and surface water and the function of sensitive ground water recharge/discharge areas, aquifers and headwaters will be protected or enhanced

Some intermittent streams are used by fish at certain times of the year while others are not. Some streams that are not used directly by fish may nevertheless contribute to fish productivity downstream. They provide water to downstream areas and may be sources of food and nutrients. Some contain important upwelling areas that supply cold water to downstream fish populations. Adjacent lands should be identified on all intermittent streams that are used directly by fish as well as on those that contribute to fish productivity downstream (Figure 2.4). The latter streams tend to have sustained surface or groundwater flow (i.e., not just in response to storm events) on

a regular basis (i.e., all or most years). These streams can generally be identified by the presence of a distinct and defined channel, indicating sufficient surface water flow to form and maintain such a channel, together with the presence of hydric soils and/or hydrophytic plants, indicating the occurrence of regular groundwater flow. If these features are not visible during a site inspection, the stream likely does not make a significant contribution to fish productivity, and no adjacent lands need be identified (Figure 2.4). The best time to conduct these site inspections is in the late spring. Regardless of a stream's contribution to fish productivity, however, potential downstream impacts of development should be considered (e.g., sedimentation, increased channel erosion, changes in base flow and water quality).

In addition, the results of impact assessment may indicate the need to maintain vegetative buffer strips on all or part of the adjacent lands. The width of buffer strips will vary depending on the potential risk to fish habitat. For example, a larger buffer area may be required in areas where the potential risk to fish habitat is relatively high, due to steep slopes and highly erodible soils, or to protect the habitat of endangered and threatened fish species.

The Province recommends that adjacent lands are those within 30 metres of fish habitat. Thirty metres is recommended because it encompasses an area which, if developed without adequate controls, is reasonably likely to result in negative impacts on adjacent fish habitat.

Considerations in recommending the extent of adjacent lands include the role of natural riparian vegetation in providing fish habitat, filtering sediment and nutrients, shading and cooling surface waters, and contributing organic matter to waterbodies, among other functions. Site-specific evaluations based on the considerations noted above may demonstrate the need for greater or lesser distances for adjacent land widths.

Certain development activities, e.g., stormwater discharge; taking of groundwater, can cause negative impacts even if they occur considerably more than 30 metres away from fish habitat, unless they are adequately controlled . Consequently, controls may be needed with respect to erosion, use of ground water, changes in water infiltration, and stormwater discharge wherever they occur in the planning area (see ***Policy 2.4***).

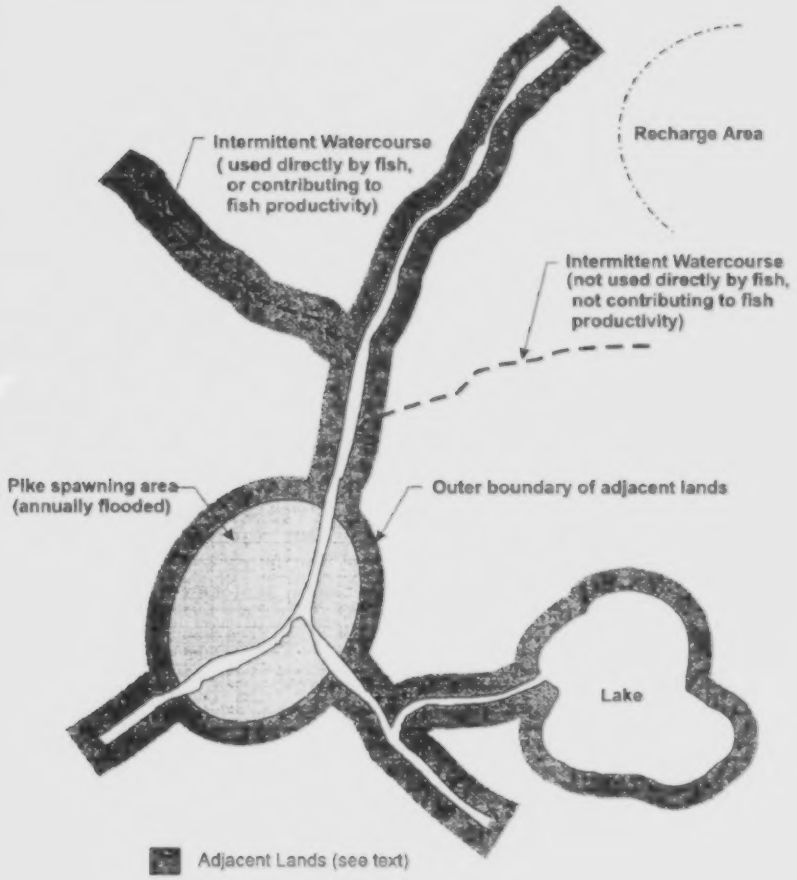
(d) Information Sources

The OMNR is in the process of making its fish habitat information available to planning authorities. The Ministry will also develop guidelines for the collection of fish habitat information to assist in the identification and evaluation of habitat.

The OMNR has information on the location, quantity and quality of fish habitat. This information may include fish species distribution, habitat mapping, habitat assessment reports and inventory data, and status reports and recovery plans for endangered and threatened fish species. For additional information on endangered and threatened fish species, refer to Section 2.3 (d). Conservation authorities have pertinent information on flood limits and water levels. They may also be able to provide watershed inventories or management plans. The Ministry of the Environment has information on provincial water quality objectives and may have data on water quality and quantity for local watercourses.

Where OMNR does not have sufficient information on fish habitat to meet planning needs, a planning authority will need to obtain information through watershed planning or by requiring it as part of an impact assessment.

FIGURE 2.4 Adjacent Lands - Fish Habitat (Lakes and Rivers)



The OMOE's Surface Water Units, which are located in the ministry's regional offices, can provide additional information on Lake Capacity Modeling, for the purpose of evaluating lakeshore development capacity limits.

2.5 SIGNIFICANT WOODLANDS

(a) Background

> ***Woodlands means treed areas that provide environmental and economic benefits such as erosion prevention, water retention, provision of habitat, recreation and the sustainable harvest of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance.***
> (Provincial Policy Statement Definition)

The PPS applies to those woodlands located south and east of the Canadian Shield (Figure 2.1) which have been identified as significant.

Woodlands perform a number of important ecological functions. They affect both water quantity and water quality by reducing the intensity and volume of stormwater runoff and decreasing soil erosion and flooding. By removing nutrients, sediments and toxins from surface water runoff and sub-surface flows, woodland vegetation contributes to the maintenance of water quality in the province's lakes and streams. The shade provided by woodlands located adjacent to water bodies also helps keep water temperatures cool, helping to maintain high quality habitat for desirable sports fish species such as brook trout. Woodlands may also contribute to the protection of groundwater recharge areas. Some woodlands are also wetlands, i.e., wooded swamps.

Woodlands also perform important ecological functions related to the integrity of ecosystems. At the landscape scale, the size of woodlands and their linkages to other woodlands are important factors in maintaining woodland integrity and the survival of a host of species that depend upon them. The presence of breeding populations of forest-interior and area-sensitive birds may identify high quality, relatively unfragmented woodlands.

Woodlands also have economic benefits. The sustainable harvest of wood products through good forestry practices can support local forest industries and provide important income to woodlot owners. The sustainable harvest of these and other forest resources, such as maple syrup and fuelwood contribute significantly to the economies of many of southern Ontario's rural communities.

In less than 200 years, southern Ontario has been altered from a predominantly forested landscape to one dominated by a wide variety of agricultural, industrial and urban land uses. In that part of the province located south and east of the Canadian Shield, over 70 % of the original woodlands have been lost (Riley and Mohr, 1994).

(b) Identification and Evaluation

The identification and evaluation of significant woodlands is a planning authority responsibility. Approaches to compiling and assessing woodland information will vary depending on the resources of the planning authority, availability of information, development pressures and the nature and extent of the woodlands present in the planning authority.

The use of Geographic Information Systems and digital mapping of woodland boundaries will greatly facilitate the identification and evaluation of woodlands. An "on-screen" methodology has been developed by OMNR for creating digital woodland maps using LANDSAT imagery as a backdrop to the Ontario Base Mapping (OBM) vegetation, transportation and drainage layers (OMNR, 1997a). In the absence of a digital woodland polygon layer, the digital OBM vegetation layer can provide a good approximation of woodland locations. Other sources of information include Ontario Landcover Mapping (available from OMNR), Forest Resources Inventory aerial photography (from 1978 for most of southern Ontario and from 1991 for eastern Ontario), more recent aerial photography (often available from planning authorities and/or some conservation authorities), Environmentally Sensitive Area Reports (ESA) prepared by conservation authorities and municipalities and ANSI reports (available from OMNR) and colour infrared aerial photography (from 1994 for most of southern Ontario in both digital and photo image format).

Attachment A.4 provides suggested detailed factors and standards for evaluating the significance of woodlands. Woodlands that meet the suggested standards for one or more of the factors described below can be considered to be significant. In general, woodlands that meet the suggested standards for all of the factors are more valuable than other woodlands in the same area that meet suggested standards for fewer factors. In areas with relatively low amounts of forest cover, significance can be based on fewer factors meeting the suggested minimum standards.

The OMNR has developed a standardized classification system for vegetation communities across southern Ontario (Hills Site Regions 6E and 7E), entitled Ecological Land Classification System for Southern Ontario - First Approximation and Its Application (Lee et al., 1998). Similar classification schemes are available for forest ecosystems on the Canadian Shield. Even in its preliminary form, the southern Ontario system provides a good basis on which planning authorities can begin to understand and inventory their vegetation cover to assess key ecological relationships and to determine relative abundance and rarity of certain habitat units. Local OMNR offices should be contacted for more information about the use and application of the ecological land classification (ELC) system.

- Woodland Size

Larger woodlands are more likely to contain a greater diversity of plant and animal species and communities than smaller woodlands and are better buffered against the harmful edge effects of agricultural or urban activities than smaller areas. Larger woodlands are more likely to maintain fuller, more resilient nutrient cycles and food webs and to be large enough to permit the different and important successional stages to co-exist on the site (OMNR, 1991) while small isolated woodlands are more susceptible to blowdown, drought, disease, and insect infestations and invasions by predators and non-indigenous plants (Pearce, 1992).

It is suggested that woodland size be evaluated in the context of the percent forest cover in the planning area and/or regional landscape because the viability of woodland wildlife is dependent not only upon the characteristics of the woodland in which they reside, but also upon the characteristics of the landscape in which the woodland occurs. Attachment A.5 provides information on patch size relative to suitability for certain wildlife species.
In planning areas where woodland cover is less than 5 % of the land base, even the smallest woodlands may be important to the biological diversity of the local area since they provide the only habitat for woodland-dependent species.

- Ecological Functions

Woodland shape, linkages, diversity and proximity are all considerations relative to woodland functions. For example, woodland shape affects the relative amounts of edge and interior habitats, thereby affecting wildlife. Also, woodlands that contain or overlap any or several other natural heritage features or areas could be considered more valuable or significant than those which do not. Similarly, woodlands that are connected (or linked) to other woodlands, other natural heritage areas or water, could also be considered more significant than those which are not connected.

Woodlands which extend across a variety of terrain features tend to consist of a broader range of vegetation communities, and/or more highly interspersed vegetation communities, than those that occur in more uniform settings. These more diverse woodlands contain more plant and animal species, and provide more habitat features than less diverse woodlands. Attachment A.6 summarizes information sources helpful for identifying areas with high diversity of plants, birds and amphibians.

Distance between habitat patches also affects their value to wildlife. Woodland patches that are relatively close together are more valuable than woodland patches (of the same size) located further apart.

- Uncommon Woodlands

In southern Ontario, woodlands which are: (a) composed of rare tree species and/or are a rare forest community type; (b) dominated by old trees or old-growth; (c) very large (e.g., more than 100 ha in size or more than 400 ha if forest cover is greater than 30%); or (d) highly productive tableland woodlands, are uncommon and could be considered significant.

- Woodland Economic and Social Values

Managed woodlands (i.e., those subject to long term management agreements and/or management plans) may provide benefits in addition to those identified above. Due to the fragmented nature of the many small woodlands (less than 100 ha) in southern Ontario, management of woodlands may play an important role in maintaining their ecological integrity. For example, invasive, exotic plant species are less likely to become established in large tracts of appropriately managed woodlands.

In areas with low percent forest cover (less than 5 %), plantations can provide an important nucleus for forest succession (if managed) to natural hardwood forest, especially if these plantations can provide important habitat and or act as a buffer, and also serve as a linkage to other woodlands, other natural heritage areas or water.

(c) Adjacent Lands

Adjacent lands are the lands within which impacts must be considered and within which the compatibility of a development proposal must be addressed. The extent of adjacent lands may vary depending on such factors as potential changes to surface water hydrology, survivability of trees located near the woodland edge and disruption to wildlife movement patterns. Planning

authorities may define adjacent lands using a variety of approaches depending on site-specific conditions. In all cases, these approaches should meet the overall objective of protecting significant woodlands from incompatible development.

The Province recommends that adjacent lands are those lands within 50 metres of a significant woodland. This width is recommended since development within 50 metres of significant woodlands has a reasonable probability of affecting the ecological functions of the woodlands. Considerations in recommending the extent of adjacent lands focus on the protection of the woodland vegetation; the tree species and woodland structure; canopy height, age and closure; projected rooting zones; potential for water table changes; and the influence on tree health of windthrow, sunscald, salting and adjacent uses. Adjacent development or site grading may also introduce undesirable plant or animal species and disrupt wildlife habitats in the woodland. Site-specific evaluations based on the considerations noted above may demonstrate the need for greater or lesser distances for adjacent land widths.

(d) Information Sources

Useful information for evaluating significant woodlands is available from a variety of sources, as previously noted in Section 2.5 (b). Other sources of information include OMNR files and staff, the local forest industry, existing planning authority and conservation authority documents, agencies such as the Federation of Ontario Naturalists, naturalist clubs and landowners.

2.6 SIGNIFICANT VALLEYLANDS

(a) Background

> ***Valleylands means a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year.***
> (Provincial Policy Statement Definition)

The PPS applies to those valleylands located south and east of the Canadian Shield. The purpose of this section is to assist in identifying significant valleylands.

Valleys may contain important economic and environmental resources, as well as rich cultural and recreational resources. In many locations, valleys are the present and historic focus of entire communities. In highly urbanized or intensively farmed landscapes, valleylands may comprise the bulk of the remaining natural area within the planning area and are often considered essential in defining the basic character of a community.

Valleys are the natural drainage systems for watersheds and, as such, they provide an appropriate context for planning and evaluating such water-related resources. It is suggested that the significance of valleylands be assessed within the context of the overall watershed.

Valleys may also:

- convey and provide short-term storage for storm and melt waters;
- perform other functions such as nutrient and sediment transport;

- often contain springs and other seepage areas which are critical to the maintenance of stream flows and water levels within riverine wetlands, as well as to the maintenance of water quality within watersheds;

- provide important fish and wildlife habitat; and

- form important natural linkages between different habitat features, providing important migration corridors.

As the "backbone" of a watershed, valleys are linear systems that may perform unique ecological functions. It is suggested that planning authorities carefully assess their valleyland systems relative to the overall protection of natural heritage features. Planning authorities may choose to designate an entire valley or portions of a valley as a significant valleyland, depending upon the extent and quality of the valleyland resource within the planning authority.

As noted above, valleys may constitute the only remaining natural areas in some planning areas and, as such, they can form the basis for the natural heritage system within a planning area. In addition, many of the other natural heritage features and areas can be found in valleylands. Consequently, it is recommended that valleylands be assessed as an integral part of a planning authority's overall natural heritage system.

(b) Identification and Evaluation

The identification and evaluation of valleylands is the responsibility of a planning authority. Many planning authorities find the adoption of a natural heritage system approach (see Section 3) to be useful in identifying and evaluating valleylands.

The physical boundaries of the valleys should first be identified. Some valleylands are found within a distinct valley landform. Others, in the headwater areas, may not have a defined watercourse channel where flow is overland and originates from springs, seepage areas and surface run-off. The physical boundaries are generally determined as follows:

- for well-defined valleys, the physical boundary is generally defined by the stable top-of-bank or the predicted top-of-bank; and

- for a less well-defined valley or stream corridor, the physical boundary may be defined in a number of ways including the consideration of riparian vegetation, the flooding hazard limit, the meander belt or the highest general level of seasonal inundation.

The following are examples of factors that can be used in the evaluation of natural areas within valleys or other landform depressions:

- prominence as a distinctive landform;

- degree of naturalness;

- ecological functions (habitat, linkages, etc.)

- restoration potential; and

- historical-cultural value.

Further details on these suggested factors are found in Attachment A.7. Planning authorities may develop factors that are relevant within their own planning context and circumstances.

(c) Adjacent Lands

Adjacent lands are the lands within which impacts must be considered and within which the compatibility of a development proposal must be addressed. Factors to assist planning authorities in defining adjacent lands are provided in Sections 2.4(c), 2.5(c) and 2.7(c). Planning authorities may define adjacent lands using a variety of approaches depending on site-specific conditions. In all cases, these approaches should meet the overall objective of protecting the valleyland from incompatible development.

The Province recommends that adjacent lands are those lands within 50 metres of significant valleylands. This adjacent land width is recommended based on concerns related to, among other things, protecting stable (usually forested) woodland vegetation, stable riparian vegetation, stable wildlife habitats and stable slopes. Site-specific evaluations based on the considerations noted above may demonstrate the need for greater or lesser distances for adjacent land widths.

(d) Information Sources

Useful information for the evaluation of significant valleylands includes mapping at various scales, resource inventories, watershed and subwatershed plans, existing municipal planning documents and related background studies. In addition, floodline mapping, hazard land mapping and Fill, Construction and Alteration to Waterways Regulation mapping are available from the conservation authorities. Local OMNR offices may also have hazard land and floodline mapping. Additional information on significant valleylands is available from the OMNR, the Ontario Ministry of the Environment, conservation authorities, planning authorities and conservation groups.

The OMNR Natural Hazards Training Manual (OMNR, 1997b) may also be consulted. This manual:

- provides an overview of suggested approaches and standards for defining the areas of provincial interest relative to natural hazards;
- identifies alternative means to address unique, local conditions;
- identifies situations where development and site alterations should not be permitted;
- identifies approaches that could be applied where development and site alterations may be considered; and
- provides information on the linkages between each of the natural hazard policies and other resource policy interests and how they may be addressed.

2.7 SIGNIFICANT WILDLIFE HABITAT

(a) Background

> ***Wildlife habitat means areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual life cycle; and areas which are important to migratory or non-migratory species.***
> (Provincial Policy Statement Definition)

The provision of habitat is one of the primary ecological functions of natural heritage features and areas. The protection and management of wildlife habitat is fundamental to the maintenance of self-sustaining populations of wildlife and, thus, to biodiversity. Throughout Ontario, especially in the south, a great deal of wildlife habitat has been degraded or lost, largely as a result of agricultural and urban development. The resulting fragmentation of woodlands, in general, and the rel tive scarcity of large woodlands, in particular, has affected many groups of species, most notably forest-interior birds. The loss of wetland, prairie, savannah and other habitats has also resulted in reductions in wildlife associated with those habitats.

The loss of these habitats may result in the loss of the species that depend on them (or reductions in population size). The impact on the population generally goes well beyond the boundaries of the habitat that has been directly affected.

(b) Identification and Evaluation

The identification and evaluation of significant wildlife habitat is a planning authority responsibility. Determining what constitutes significant wildlife habitat will vary across the province because of differences in the distribution of wildlife species, and in the amount, distribution and quality of remaining habitat. A wildlife habitat that is poorly represented in one jurisdiction may be considered significant, whereas the same habitat may not be considered significant in a jurisdiction where it is well represented. The Significant Wildlife Habitat Technical Guide (OMNR, 1998b) provides a detailed description of factors and methodologies that can be considered when determining significant wildlife habitat.

The identification and evaluation of significant wildlife habitat is often most efficiently undertaken after the other natural heritage features and areas addressed in the policy have been identified. Where appropriate, this ensures that time is not unnecessarily spent identifying significant wildlife habitat that has already been identified and described.

Where possible, the identification and evaluation of significant wildlife habitats should be based on documented evidence of the use of a particular habitat. In some situations habitat assessments

or inventories may be required. In other situations it may be appropriate to use habitat modeling techniques to evaluate significant wildlife habitat.

Significant wildlife habitat is described under the following four sections:

- seasonal concentrations of animals;

- rare vegetation communities or specialized habitats for wildlife;
- habitats of species of conservation concern; and
- wildlife movement corridors.

- **Seasonal Concentrations of Animals**

Areas of seasonal concentrations of animals are areas where animals occur in relatively high densities at specific periods in their life cycle and/or particular seasons. At such times they are most vulnerable to disturbance or the effects of weather. Areas of seasonal concentration tend to be localized and relatively small in relation to the area of habitat used at other times of the year.

The identification of habitats associated with seasonal concentrations of animals is usually based on known occurrences, wherever possible. In some situations, however, it may be appropriate to identify areas that have the potential to be important as seasonal concentration areas, but are presently underutilized.

Attachment A.8 suggests factors useful for the identification and evaluation of seasonal concentration areas.

- **Rare Vegetation Communities or Specialized Wildlife Habitats**

The protection of rare vegetation communities or specialized habitats for wildlife is important to maintain the biodiversity across the landscape. Rare vegetation communities can include concentrations of rare plant species, and may support rare animal species. Rare vegetation communities include: 1) provincially rare communities as designated by the staff at the Natural Heritage Information Centre (NHIC) in Peterborough (Bakowsky, 1996); and 2) vegetation communities and landforms that are poorly represented in the planning area.

A suggested methodology for ranking rare vegetation communities was developed by The Nature Conservancy (U.S.) and applied to southern Ontario (Bakowsky, 1996). Communities are ranked based on the number of known occurrences and the percent of the land area they occupy. Rarity at the local level (planning area) can be based on the same factors.

As noted in Section 2.5(b), the OMNR has developed a standardized classification system for vegetation communities across southern Ontario, entitled Ecological Land Classification System for Southern Ontario - First Approximation and Its Application (Lee et al., 1998). Similar references are available for central Ontario (Chambers et al., 1997) and northwestern Ontario (Racey et al., 1996). These documents can assist planning authorities in classifying vegetation communities, while the community ranking noted above (Bakowsky, 1996) can be used to determine their rarity relative to other occurrences across the province, and beyond.
Specialized wildlife habitats include: habitats for wildlife with special needs (e.g., special nesting or feeding requirements and specialized seasonal needs), areas with exceptionally high species diversity and areas of old growth or mature forest.

Attachment A.9 suggests factors useful for the identification and evaluation of rare vegetation communities or specialized wildlife habitats.

- **Habitats of Species of Conservation Concern (Excluding Habitats of Endangered and Threatened Species)**

Habitat of species of conservation concern can include significant portions of the habitat of species that are rare, substantially declining or have a high percentage of their global population in Ontario. This wildlife habitat is exclusive of those habitats for species covered under the Significant Habitat of Endangered and Threatened Species component of the Natural Heritage Policy.

Rare species are important because they often live in declining or uncommon habitats and are very sensitive to additional habitat loss. These species are not evenly distributed across the landscape. Typically their habitats occupy a small portion of the landscape within the planning area.

Species that could be considered as species of conservation concern include:

- those listed under the "Vulnerable" heading in the lists of Vulnerable, Threatened, Endangered, Extirpated or Extinct Species of Ontario. These lists are updated periodically by the OMNR;
- species that are rare within the planning area, even though they may not be rare provincially;
- species that are listed as rare or historical in Ontario based on records kept by the Natural Heritage Information Centre;
- species whose populations are known to be experiencing significant declines in Ontario; and
- species that have a high percentage of their global population in Ontario and are rare or uncommon in the planning area.

There are two steps involved in protecting habitats for species of conservation concern. The first step is determining which species of conservation concern are found in the planning area and determining which of these species should receive protection. Generally, species that are rare at larger scales (nationally, provincially and site region) are of greater priority than rarity at the local level. The second step is determining how much habitat should be protected. The focus is generally on those sites that provide the best habitat for sustaining existing populations or habitats that provide the best opportunity for future expansion, re-colonization or restoration.

Attachment A.10 suggests factors that could be used to determine the designation of species of conservation concern and to select habitats of greatest priority.

- **Wildlife Movement Corridors**

Wildlife movement corridors are habitats that link two or more other wildlife habitats that are critical to the maintenance of a population of a particular species or group of species. The key ecological function of wildlife movement corridors is to enable wildlife to move to, and between, areas of significant wildlife habitat or core natural areas, with a minimum of mortality. They can provide critical links between shelter, feeding, watering, growing and nesting locations. They

can also be critical to the dispersal of young or seed, re-colonization after local extinctions and the prevention of inbreeding of otherwise isolated populations. For example, protecting a significant wintering area for deer will be of little value if there is no corridor allowing movement to and from the site.

Wildlife movement corridors can be valuable at different spatial scales. For example, corridors that might be important at local (i.e., municipal) or regional (e.g., watershed, site district, site region) scales are those that:

- allow large mammals, such as deer, to move from their summer range to wintering areas; and

- allow wildlife to move freely between different parts of their habitat on a daily, seasonal or annual basis (e.g., from winter hibernation habitat to summer range).

Wildlife movement corridors that might be important at larger (e.g., provincial or national) scales include stopover and staging habitat along bird migration routes. For example, wetlands provide important stopover habitat for waterfowl and woodlands provide stopover habitat for many land birds. Wetlands and woodlands close to the Great Lakes are particularly important.

Many types of habitat can provide wildlife movement corridors. These can include wetlands, wooded areas connecting forest patches, as well as meadows and old fields connecting more open habitats. Understanding the corridor habitat requirements of a species is important when planning for its protection. Streams, river valleys and lake shorelines provide some of the best corridors and, in some planning areas, these are the only significant animal movement corridors that remain.

The identification of wildlife movement corridors is most effectively undertaken after the other significant wildlife habitats (e.g., concentration areas) and other natural heritage features and areas have been identified and mapped. A comprehensive approach could be particularly valuable in the identification process because: 1) existing linkages can be readily identified and evaluated; and 2) areas in which linkages are needed can be identified. At finer scales, planning authorities can capitalize on opportunities that may exist within their municipalities when identifying existing and/or potential wildlife movement corridors. Abandoned railway lines and unopened road allowances, although not necessarily ideal, may be a convenient way of setting some land aside for animal movement.

Attachment A.11 suggests examples of factors that could be used to evaluate the significance of wildlife movement corridors.

(c) Adjacent Lands

Adjacent lands are the lands within which impacts must be considered and within which the compatibility of a development proposal must be addressed. Planning authorities may wish to consider the following factors in determining the alternative adjacent land widths associated with significant wildlife habitat:

- sensitivity of the species using the significant wildlife habitat;

- the maintenance of the identified wildlife and their habitats;
- potential for impacts during the construction phase of the development (e.g., type of construction activity, vegetation removal, time of year, etc.);
- potential impacts on wildlife species using the significant wildlife habitat after the development is completed (e.g., increased traffic, noise, predation by pets, introduction of non-native plant species, further removal of vegetation, etc.);
- cumulative impacts of subsequent developments; and
- potential for mitigation of temporary and long-term impacts.

Planning authorities may define adjacent lands using a variety of approaches depending on site-specific conditions. In all cases, these approaches should meet the overall objective of protecting significant wildlife habitat from incompatible development.

The Province recommends an adjacent land width of 50 metres as a guideline for considering whether development may have an impact on significant wildlife habitat and that some assessment of potential impacts may be required. Considerations in recommending the extent of adjacent lands are those listed above. Site-specific evaluations based on the considerations noted above may demonstrate the need for greater or lesser distances for adjacent land widths.

(d) Information Sources

Attachment A.12 provides sources of information helpful for the identification and evaluation of significant wildlife habitat.

Information on rare species known to occur in a planning area, along with their locations, can be obtained from local OMNR offices. Lists of regionally rare species also exist for many counties, regional planning authorities and ecological regions and can be obtained by referring to appropriate reports, atlas data and discussions with local experts. Additional information may also be available from conservation authorities and local naturalist groups.

2.8 SIGNIFICANT AREAS OF NATURAL AND SCIENTIFIC INTEREST

(a) Background

Areas of natural and scientific interest (ANSI) means areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education. (Provincial Policy Statement Definition)

A significant area of natural and scientific interest (ANSI) is:

an area identified as provincially significant by the Ministry of Natural Resources using evaluation procedures established by the province, as amended from time to time. (Provincial Policy Statement Definition)

ANSIs can be divided into two types - life science ANSIs and earth science ANSIs. To date, more than 500 provincially significant ANSIs (both types) have been identified.

Life science ANSIs are significant representative segments of Ontario's biodiversity and natural landscapes including specific types of forests, valleys, prairies and wetlands, their native plants and animals, and their supporting environments. They contain relatively undisturbed vegetation and landforms, and their associated species and communities. Provincially significant life science ANSIs include the most significant and best examples of the natural heritage features in the province and many will correspond with other significant features and areas such as wetlands, valleylands and woodlands.

Earth science or geological ANSIs consist of some of the most significant representative examples of the bedrock, fossil and landforms in Ontario, and include examples of ongoing geological processes.

ANSIs play an important role in the protection of Ontario's natural heritage since they best represent the full spectrum of biological communities, natural landforms and environments across Ontario.

(b) Identification and Evaluation

ANSIs are ranked by the OMNR as being of either provincial or regional significance. For the purposes of the PPS, significant ANSIs include only those ANSIs identified as provincially significant.

The selection and evaluation of life science or ecological resources has taken its direction from A Framework for the Conservation of Ontario's Biological Heritage (Beechey, 1980) (also known as the Life Science Framework) and updates. The framework adopts a hierarchical approach for organizing ecological diversity that recognizes site regions and site districts as the major ecological divisions in Ontario. Within a particular site district, finer scale ecological units are used to determine the features and areas that should be represented (e.g., landforms, vegetation communities, etc.).

Earth science targets are based on A Framework for the Conservation of Ontario's Earth Science Features (Davidson, 1981) (also known as the Earth Science Framework) and updates. Earth science features are defined as the physical elements of the natural landscape, created by geological processes and distinguished by their stratigraphy and topography. Typical or representative features are identified using lithologic, paleontologic and geomorphic classifications systems. These features are then organized into geological themes based on their age and formational environment.

The best representative sites which do not occur within provincial parks or other protected areas are considered to be provincially significant ANSIs. Other sites that also provide good representation may be identified as regionally significant ANSIs.

The following five factors, which are similar for both life and earth science ANSIs, are used to evaluate potential ANSIs:

1. Representation of geological themes or of the landform-vegetation features of an ecological site district;

2. Condition, which considers existing and past land uses as a means of assessing the degree of human-induced disturbance;

3. Diversity, which assesses the number of high quality, representative features that exist within a site;

4. Other ecological considerations, particularly those related to hydrological function and connectivity (linkages with other natural areas), size, shape, proximity to other important areas, etc.; and

5. Special features, which includes populations of vulnerable, threatened or endangered species, special habitats, unusual geological features, and educational or scientific value.

Earth science ANSIs are generally less sensitive to development and site alteration than life science ANSIs. Ecological functions do not normally need to be considered and mitigation should focus on the need to retain the educational, scientific and interpretive value of the area and features in question. Appropriate land uses are generally those that conserve topography, stratigraphic exposures and other geologically defining features for which the area was identified.

A number of considerations are important in deciding how many ANSIs are required to meet representation targets in an ecological site district (see Appendix D - Glossary of Terms). There are usually several major landform types in an ecological site district, each with distinctive vegetation patterns. As a result, there are several landform-vegetation themes in each site district. ANSIs are selected to represent these themes.

In some ecological site districts, large areas may be occupied by a particular landform type, and its features may be poorly represented or lacking in existing protected areas. In such cases, more than one provincially significant ANSI may be selected to represent the range of site conditions and biotic communities associated with a landform. This is especially the case in southern

Ontario where landscape fragmentation has often eliminated opportunities to represent entire landscape segments in single ANSIs.

Where more than one ANSI is selected, they represent different and complementary natural features of the site district. They fulfill the five factors noted above, and may contain one or more of the following: superb examples of vegetation communities, outstanding concentrations of special features, or significant ecological functions.

Similarly, for earth science evaluations, the number of elements or features identified to represent a theme depends largely on the spatial distribution of the theme and its complexity. Some bedrock themes are so restricted that only a few sites are identified on the ground. Themes related to glacial time cover large portions of the province, and need many important sites for their definition. The five factors described above assist in choosing representative elements of each theme.

With the satisfactory completion of site selection and evaluation, reports are finalized as "Open File Ecological Reports".

As noted with wetlands, ANSIs are dynamic ecosystems and can change over time through such processes as natural succession and changing water levels. Although the main character of the ANSI is generally quite stable, outer boundaries can change and boundary verification or re-evaluation may be necessary from time to time. In addition, as more scientific information becomes available, the evaluation of ANSIs may change.

It is recommended that OMNR be consulted before any decisions relative to potential impacts on earth science ANSIs are finalized.

(c) Adjacent Lands

Adjacent lands are the lands within which impacts must be considered and within which the compatibility of a development proposal must be addressed. The extent of adjacent lands may vary depending on such factors as hydrology, topography, soil conditions, potential disruption of wildlife movement patterns, adjacent land uses and other features. Planning authorities may define adjacent lands using a variety of approaches depending on site-specific conditions. In all cases, these approaches should meet the overall objective of protecting ANSIs from incompatible development.

The Province recommends that adjacent lands are those lands within 50 metres of an ANSI. This width is recommended based on considerations related to, among other things, protecting typical woodland edges, riparian vegetation and wildlife habitats, as well as unusual and distinctive vegetation communities and geological formations for which the ANSI may be identified. Site-specific evaluations based on the considerations noted above may demonstrate the need for greater or lesser distances for adjacent land widths.

(d) Information Sources

The OMNR has a data base of information and mapping on ANSIs. Information for each ANSI includes ANSI type, location, size, relationship to other ANSIs, vegetation, landform, current

uses, historical uses, management details and lists of known rare species. Some of this information is being computerized by OMNR.

In addition, A Framework for the Conservation of Ontario's Biological Heritage (Beechey, 1980) and A Framework for the Conservation of Ontario's Earth Science Features (Davidson, 1981) and Natural Heritage Resources of Ontario: Bibliography of Life Science Areas of Natural and Scientific Interest in Ecological Site Regions 6E and 7E, Southern Ontario (Riley et al., 1997) are useful references.

3. THE NATURAL HERITAGE SYSTEM APPROACH

3.1 INTRODUCTION

Section 2 of this document outlines how individual natural heritage features and areas cited in Section 2.3.1 of the Provincial Policy Statement (PPS) can be identified and evaluated. A natural heritage system approach is a useful method for the protection of specific natural heritage features and areas because it reinforces an understanding that individual areas and features have strong ecological ties to other physical features and areas in the overall landscape.

A natural heritage system approach supports Section 2.3.3 of the PPS which states that ***the diversity of natural features in an area, and the natural connections between them should be maintained, and improved where possible***. This encourages planning authorities to go beyond the protection of specific natural heritage features and areas to consider the overall diversity and interconnectivity of natural features or areas.

A number of approaches have been adopted in developing natural heritage systems, including natural area, greenspace and watershed studies. Planning authorities who have completed these studies may have already identified a natural heritage system.

The use of a natural heritage system approach facilitates the co-ordination of ecosystem-based and watershed-based issues across planning authority boundaries, as recognized in Section 1.1.1(e) of the PPS, by recognizing important linkages (e.g., features such as valleylands, and ecological functions such as hydrological connectivity) that extend beyond planning area boundaries.

This approach offers other advantages:

- It allows for the assessment of individual natural heritage features and areas in the context of the overall landscape, not just on the basis of their own site-specific value (e.g., role in connectivity, wildlife habitat outside the area, buffers, etc.).

- It enables the identification of the most important natural heritage features within an area (from either representation, theme or linkage perspectives).

- It can lead to a reduction in costs by integrating and focusing subsequent study on natural heritage features and areas that are most likely to be sensitive to impacts.

The maintenance of natural heritage systems is an ongoing process. Natural ecosystems are dynamic, and as a result, natural heritage systems should be upgraded and refined as new information becomes available.

3.2 CHARACTERISTICS OF A NATURAL HERITAGE SYSTEM APPROACH

A natural heritage system can be identified through a variety of approaches such as the four step process outlined below.

Step 1 - Inventory (see Figure 3.1)

A planning authority may begin by compiling an inventory of relevant bio-physical and socio-economic information including:

- streams and lakes;
- topography, steep slopes and landforms;
- forest cover, vegetation, habitat types and areas and fish and wildlife populations;
- soil and geological information; and
- areas of existing development.

Much of this information can be obtained from Ontario Base Mapping (OBM), National Topographic Series (NTS) mapping, air photos, local OMNR offices, conservation authorities and naturalist groups.

Step 2 - Identify Natural Heritage Features and Areas (see Figure 3.2)

Based on the data collected in Step 1, the planning authority identifies the areas and features that should be maintained for their natural heritage values and related ecological functions. In the ideal situation, this is accomplished by completing an inventory that incorporates all the relevant features and functions identified in Section 2 of this Manual. In planning areas where such inventories are not complete, other means of identifying "significant" areas may be developed. For example, the planning authority may consider all non-planted woodlots in excess of 25 hectares as "significant woodlands". Local OMNR offices, conservation authorities and naturalist groups can assist planning authorities in developing factors for features and areas that meet the intent of Section 2.3.3 of the PPS. Relevant features and functions may also be derived from watershed and subwatershed planning exercises (see Section 7.3). Appendix B also identifies ecological factors that are commonly considered when developing natural heritage systems. Note that some natural areas and features are identified as being not significant. These areas, and the developed portions of the planning area, are shaded a light gray colour in Figure 3.2, 3.3 and 3.4.

Planning authorities may wish to include "potential" or "preliminary" natural heritage areas or features whose significance may be confirmed and/or refined in subsequent or more detailed evaluation phases (i.e., as part of an official plan amendment application or watershed planning exercise). Given that the PPS provides the minimum standard, planning authorities may also wish to identify other natural heritage features and areas that they consider significant within their local context.

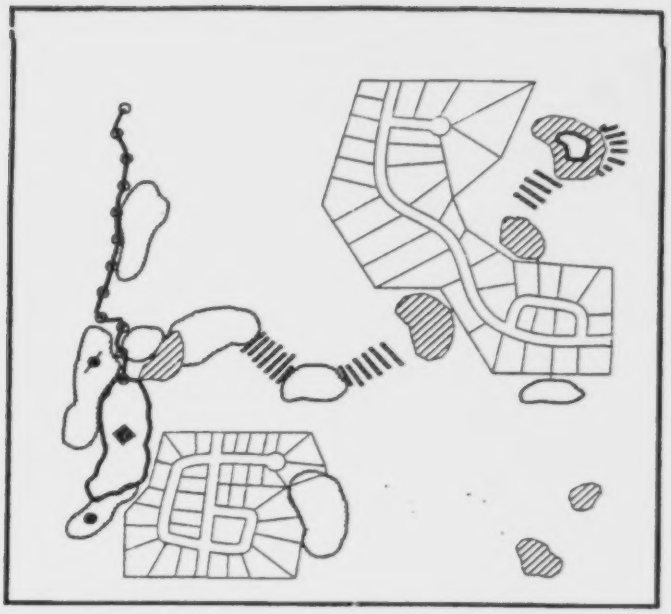


Figure 3.1
STEP 1 Inventory

- Stream
- Lake, Pond
- Woodland
- Steep Slopes
- Existing Urban Development
- Coldwater Fishery
- Wetlands
- Heronry
- Deer Yard
- Warmwater Fish Habitat

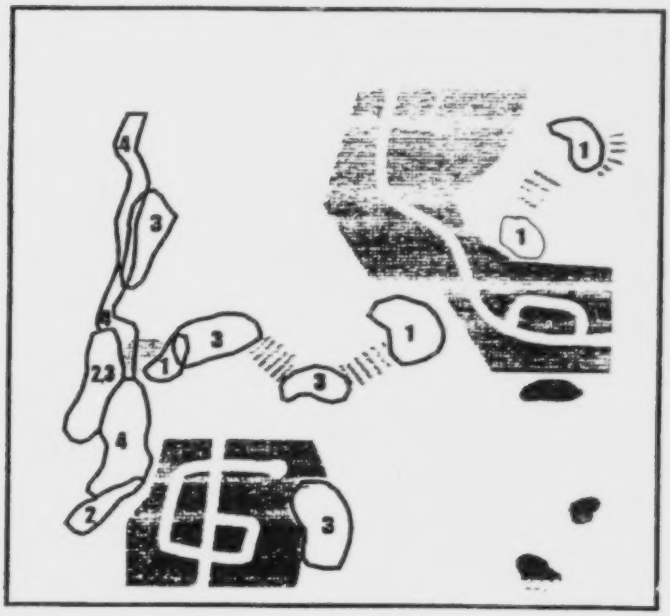


Figure 3.2

STEP 2 Identify Natural Heritage Features and Areas

- 1 Significant Wetlands
- 2 Significant Wildlife Habitat
  - heronry, deer yard
- 3 Significant Woodlands
- 4 Fish Habitat
  - cold water stream
  - warmwater fish habitat

Figure 3.3
STEP 3
Identify Areas to Maintain Diversity and Connectivity

- Natural Areas and Features Identified in Figure 3.2
- Adjacent, Connecting Steep Slope
- Adjacent, Connecting Woodlands
- Adjacent Riparian Land

Figure 3.4
STEP 4
Identification of a Natural Heritage System

Step 3 - Identify Areas Requiring Protection in Order to Maintain Diversity and Connectivity (see Figure 3.3)

The planning authority may then identify areas needed to ensure that the diversity and connectivity of areas identified in Step 2 are maintained. This entails:

- identifying connecting links, corridors and buffer areas between or adjacent to these areas that should be maintained and/or restored; and

- identifying other significant natural features or areas that were not identified in Step 2 in order to maintain diversity of natural features.

The maps developed in previous steps may be useful in identifying connecting links and adjacent lands. Often connecting links and adjacent lands can be identified along well-defined natural features such as stream valleys, steep slopes or wooded areas.

Step 4 - Implementing the Natural Heritage System (see Figure 3.4)

This natural heritage system is comprised of the areas defined in Step 2 and the additional areas defined in Step 3. Implementation of the natural heritage system approach may address how these areas will be maintained (e.g., protection in the official plan, purchase, landowner agreement, etc.) and a strategy for upgrading or refining information and incorporating appropriate changes in the natural heritage system.

Other factors should be considered in defining a planning authority's natural heritage system, including:

- public and landowner input regarding the conservation of identified natural heritage features and areas;

- economic benefits and costs of conserving natural heritage features and areas;

- size, scale and overall extent of the areas identified for protection and restoration;

- the representation of a diversity of indigenous species, biotic communities and landscapes; and

- the feasibility of connecting, maintaining or improving natural heritage features and areas within the context of social and economic considerations. In particular, the municipality should work with private landowners to ensure that connecting links on private land are consistent with their needs and objectives.

The proportion of a planning area identified as a natural heritage system may vary in relation to the physical and biological character of an area, as well as the pattern of settlement and landscape alteration. Where there are few remaining natural areas, it may not be possible to identify a connected natural heritage system except where efforts are made to encourage restoration or rehabilitation.

In planning areas where there is little natural cover left, the emphasis should be on protecting most of the remaining natural area. In areas where natural vegetation covers a large portion of the total land base and there is little development activity, the relative proportion of the remaining natural cover that is identified as significant may be less.

A natural heritage system approach does not eliminate the need for more detailed evaluations of specific ***natural heritage features or areas*** to determine if they are significant or potentially significant. However, some municipalities may not have the resources to undertake such evaluations on a comprehensive basis. By focusing development in areas where infrastructure already exists (see ***PPS Policy 1.1 Efficient, Cost-effective Development and Land Use Patterns - Developing Strong Communities***), the impacts on natural values can be minimized. In addition, the resources needed to prepare more detailed natural heritage evaluations can be focused on and adjacent to the developing areas.

In the development of a natural heritage system, it is important to retain the capability of identifying how each part of the natural heritage system can be justified within the context of Sections 2.3.1 and 2.3.3 of the PPS. A particular area illustrated on Figure 3.4 may be a significant wetland and fish habitat while another area may be a significant woodland and wildlife habitat. Each of these areas is subject to specific policy requirements. It is important to identify the specific locations and type of each natural heritage feature and area (Figure 3.2) within the natural heritage system (Figure 3.4) since this information meets the policy requirement to know the ***features ... for which an area is identified***, and allows the user of a planning document to know which policy provisions, adjacent lands, etc., apply to a particular area.

A more complete description of the natural heritage system approach can be found in The Natural Heritage of Southern Ontario's Settled Landscapes prepared by Riley and Mohr (1994). An ecological specialist can assist a planning authority in developing a natural heritage system that meets its particular circumstances.

3.3 OTHER CONSIDERATIONS IN DEVELOPING A NATURAL HERITAGE SYSTEM

In areas where data are deficient, planning authorities may have to look at innovative ways of identifying and protecting natural heritage features and areas. Sometimes other factors can be used to identify potentially significant natural heritage areas until more site-specific information is available to verify the precise location of the natural heritage feature or area. For example, all waterbodies may be considered to be fish habitat until specific inventories can determine the nature or type of fish habitat. Similarly, woodlands of a certain size and type can be identified, but their precise boundaries are unknown, in which case planning authorities may wish to define the boundaries broadly with the provision for more specific delineation as part of the development application review process.

The mapping scale at which the natural heritage system is being planned often determines the level of accuracy needed. Broad regional scale studies are often based on very general natural heritage information. Planning authorities generally use 1:50,000 to 1:10,000 scale mapping for these regional studies. A more detailed delineation of natural features and areas, based on a

mapping scale of 1:2,000 can be deferred to a more detailed planning stage (i.e., subdivision plan, secondary plan).

3.4 EXAMPLES AND INFORMATION SOURCES

Planning authorities have developed a variety of methodologies for implementing a natural heritage system approach, including natural area, greenspace and watershed studies, and in recent years, a number of large-scale greenspace and natural area studies have been undertaken. Examples of these studies are listed in Section 7.2.

During the past decade a number of watershed studies have been undertaken in Ontario. Many of these studies have dealt with both water quantity and quality issues and other natural heritage values. Section 7.3 lists documents which provide information on watershed planning considerations in natural heritage system planning.

Planning authorities can contact the OMNR and conservation authorities for assistance in undertaking watershed studies and natural heritage system planning. In addition, conservation authorities have acted in a co-ordinating role for many watershed studies.

4. ADDRESSING NATURAL HERITAGE FEATURES AND AREAS IN POLICY DOCUMENTS

4.1 INTRODUCTION

Section IV - Implementation / Interpretation of the Provincial Policy Statement (PPS) requires that: ***Official plans will integrate all applicable provincial policies and apply appropriate land use designations and policies***. There may be many ways to achieve the end results established in the PPS. However, in all cases planning authorities must have regard to the PPS.

To meet this intent, planning authorities may include policies in their official plans and zoning by-laws to:

- recognize the need to identify and protect natural heritage features and areas and the ecological functions for which the area is identified;
- protect these features, areas and functions from incompatible land uses; and
- provide a clear and reasonable mechanism for assessing the impact of applications for land use change on these features, areas and functions.

The following sections outline how natural heritage features and areas can be addressed in official plans and zoning by-laws.

4.2 OFFICIAL PLANS

Official plans may include the following items.

Goals and Objectives

Policies which identify the planning authority's commitment to protect natural heritage features and areas and related ecological functions from land use change that will negatively impact them.

Identification and Protection

Natural heritage areas are identified so that users of the official plan are aware of the presence and location of these areas and their related features and functions. Policies can limit permitted uses in (and adjacent to) these areas to existing uses and/or those uses that are compatible with the long term protection of the natural heritage areas.

Planning authorities can use a variety of means of achieving this intent including:

- placing the natural heritage features and areas in a land use designation that restricts new permitted uses to those that have no negative impact, as defined in the PPS, on
- the natural heritage features and the ecological functions for which the area is identified; and/or

- placing the natural heritage areas in a less restrictive designation and having the natural heritage areas identified as potential constraints to development. This can be done as an overlay on the land use schedule or as a separate constraint map; and

- placing adjacent lands in a comparable, less restrictive designation with adjacent lands identified as potential constraints to development. This can be done as an overlay on the land use schedule, as a separate constraint map or in the text of the official plan.

Assessing Land Use Changes

Policies that provide direction on what a planning authority may require for a land use change on, or adjacent to, a natural heritage area can be included in official plans, including direction on:

- the types of approvals required (i.e., amendments to the official plan and/or zoning by-law);

- the basis upon which the application will be assessed; and

- the types of supporting information that will be required.

Policies identify the type of information required and the justification that is expected of an applicant for a land use change. Official plans may require the applicant to:

- identify impacts of the proposed land use on natural features and areas and related ecological functions;

- identify planning, design and mitigation techniques that can be employed; and

- identify the types of planning controls (e.g., zoning restrictions, site plan control, etc.) required to ensure the necessary mitigation measures are implemented.

Planning authorities may wish to specify the form in which they will receive this information. Planning authorities can request that the support documentation be tailored to the precise needs of each application based on location, size of application and availability of existing information. Planning authorities usually require the preparation of an impact assessment to evaluate the impacts associated with a development proposal. Section 5 provides further information on assessing impacts of development.

In areas of the province where no official plans exist, amendments to zoning by-laws or zoning orders can use the PPS as the basis for assessing impacts of land use changes on natural heritage features and areas

4.3 ZONING BY-LAWS

The zoning by-law must conform to the land use provisions specified in the official plan. For example, natural heritage areas could be placed in a zoning category where the list of permitted uses is limited to those that have no negative impact on the natural heritage features or areas, and the ecological functions for which the area is identified.

Lands adjacent to natural heritage features and areas could be zoned for their existing use(s) if this (these) use(s) will not introduce negative impacts on the natural features or on the ecological functions for which the area is identified. This approach may ensure that any substantive change in land use will require an amendment to the zoning by-law which, in turn, will require an evaluation in accordance with the assessment process outlined in the policies of the official plan.

Pre-zoning of lands on, or adjacent to, natural heritage features and areas for a more intensive use would only occur where warranted based on a full evaluation of the impacts on natural heritage features and areas and ecological functions, according to the requirements of the planning authority.

5. ADDRESSING IMPACTS OF DEVELOPMENT ON NATURAL HERITAGE FEATURES AND AREAS

5.1 INTRODUCTION

The purpose of this section is to provide a guide for assessing potential impacts of development and site alteration on natural heritage features and areas, where development and site alteration may be permitted. In these situations, the Provincial Policy Statement (PPS) states that proponents demonstrate ***that there will be no negative impacts on the natural features or on the ecological functions for which the area is identified***.

> *Negative impacts means:*
>
> *a) in regard to fish habitat, the harmful alteration, disruption or destruction of fish habitat, except where it has been authorized under the Fisheries Act, using the guiding principle of no net loss of productive capacity.*
>
> *b) in regard to other natural heritage features and areas, the loss of the natural features or ecological functions for which an area is identified.* (Provincial Policy Statement Definition)

This section outlines a possible process for undertaking an assessment of impacts. This process has often been referred to as an Impact Assessment (IA) or an Environmental Impact Study (EIS). Planning authorities will be looking at ways of addressing the requirement to demonstrate no negative impacts. The process outlined here represents one such approach.

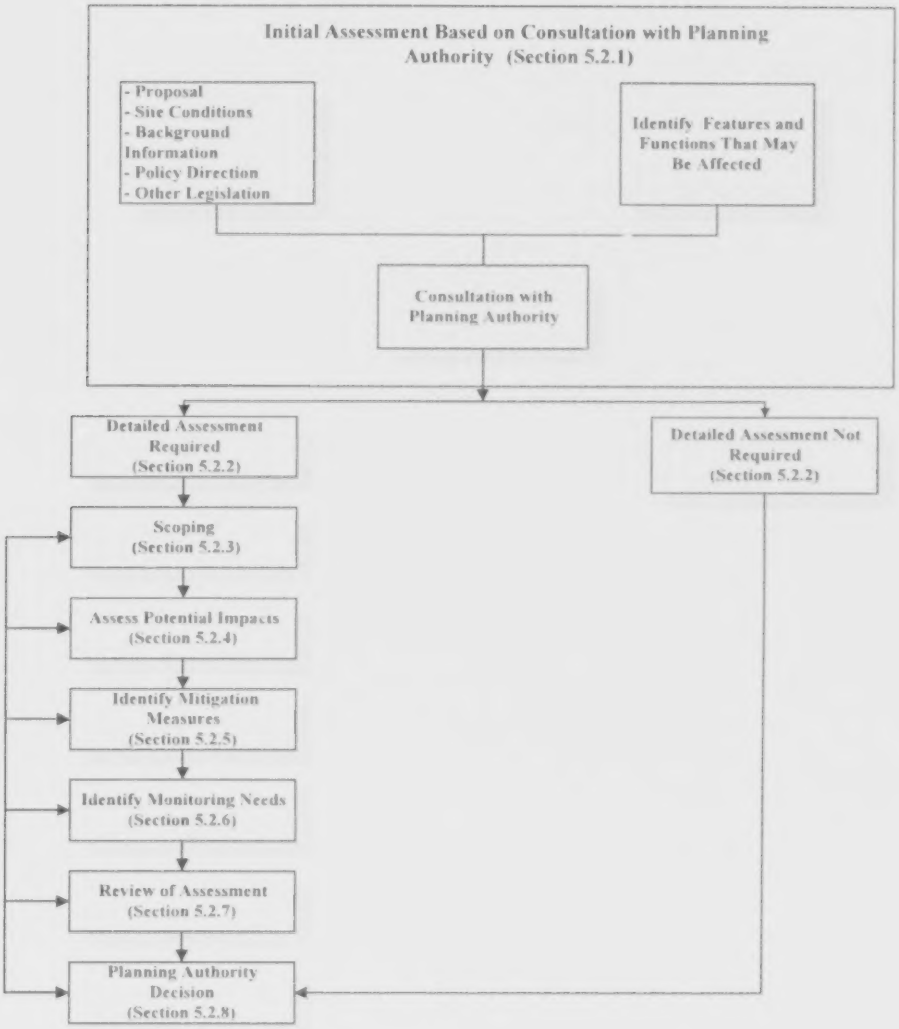
If a planning authority or applicant do not have the necessary expertise to undertake an assessment of impacts, it is strongly recommended that the impact assessment be conducted by qualified professional consultants.

5.2 AN ASSESSMENT PROCESS

An assessment of impacts requires sufficient information on a proposed development to demonstrate that ***there will be no negative impacts on the natural features or ecological functions for which an area is identified***.

The following outlines a process for assessing development impacts (see Figure 5.1).

Figure 5.1: An Example Process for Assessing Development Impacts


Initial Assessment Based on Consultation with Planning Authority (Section 5.2.1)
- Proposal
- Site Conditions
- Background Information
- Policy Direction
- Other Legislation
Identify Features and Functions That May Be Affected
Consultation with Planning Authority
Detailed Assessment Required (Section 5.2.2)
Detailed Assessment Not Required (Section 5.2.2)
Scoping (Section 5.2.3)
Assess Potential Impacts (Section 5.2.4)
Identify Mitigation Measures (Section 5.2.5)
Identify Monitoring Needs (Section 5.2.6)
Review of Assessment (Section 5.2.7)
Planning Authority Decision (Section 5.2.8)

5.2.1 Initial Assessment Based on Consultation with Planning Authority

It is strongly recommended that the proponent consult with the relevant planning authority concerning the proposed development as early in their planning process as possible. The purpose of this initial consultation is to review the application and to ensure that all relevant available information, issues and policies are considered.

The initial consultation is an opportunity for planning authorities to comment on the proposal and provide initial direction on the impact assessment. For example, they can indicate whether and how the site is addressed in official plan policies, schedules, etc. or whether a natural heritage system approach (see Section 3) has been prepared. They may also be able to provide studies that contain information on the subject property. In some situations, such as where the development proposal is straightforward and development impacts are limited or readily mitigated, consultation with the planning authority may consist of a single meeting.

On-going consultation with the planning authority, affected agencies and advisory or community groups provides a forum for discussion and resolution of development-related issues that may arise.

Assessments of development impacts may, in some situations, be incorporated into other environmental impact assessment processes, or other approval requirements such as permits under the *Public Lands Act, Lakes and Rivers Improvement Act, Conservation Authorities Act,* etc. Many infrastructure developments may be authorized under other legislation, including the *Environmental Assessment Act, the Ontario Energy Board Act*, and the *Ontario Water Resources Act*. Duplicate processes are neither advocated nor recommended. Where an assessment has to be completed under other legislation, a separate assessment process may not be necessary. It is recommended that the impact assessment requirements identified in this section be dealt with through those other processes.

Information sources and possible techniques for describing existing environmental conditions are provided in Attachment C.1. A sample review form for assessing development impacts is also provided in Attachment C.2. The form may be used to ensure that the information needs for an impact assessment have been met, and may help streamline the approvals process.

5.2.2 Detailed Assessment Required or Not

It is at this point in the assessment process that a decision on the need, or not, for a detailed assessment is made. The following are examples of situations where a detailed assessment of development impacts may not be required or relevant:

i) Provincial/municipal policy direction is available

The PPS states that: ***Development and site alteration will not be permitted in: significant wetlands south and east of the Canadian Shield; and significant portions of the habitat of endangered and threatened species***. An assessment of impacts is not relevant in these situations, since development and site alteration are not permitted. Further information on provincial policy related to the assessment of development impacts is found in the PPS and Section 2 of this Manual.

ii) The development would not have a negative impact on natural heritage features or ecological functions or adjacent lands

Previous studies may have demonstrated that, due to the nature, size, or location of certain development activities, there will be no negative impacts on natural heritage features or functions. For example, vegetation removal as part of the site preparation process is conducted well beyond, or even in, the adjacent lands of an earth science area of natural and scientific interest (ANSI).

There are situations where development impacts are predictable and standardized mitigation techniques are available which will ensure no negative impacts on the natural features or ecological functions for which the area is identified (e.g., avoiding disturbance of the habitats of sensitive wildlife species by scheduling construction when the species are not present).

5.2.3 Scoping

Scoping defines the specific needs of impact assessments, by focusing on the critical issues to be addressed. It consists of the following tasks:

- identification of the key features and functions that may be affected by development;
- identification of ecological linkages, natural processes and study area boundaries;
- determination of information needs and availability of information; and
- determination of the nature and extent of additional information or studies that may be needed.

These tasks are addressed in more detail below.

i) Identifying Key Features and Functions

> ***Ecological functions:***
>
> ***means the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biophysical, physical and socio-economic interactions.***
>
> (Provincial Policy Statement Definition)

An important challenge in an impact assessment process is to focus on the most relevant, or key natural heritage features and ecological functions. Determination of key features and functions allows the planning authority and proponent to concentrate on those characteristics of a natural heritage feature or area that have the greatest influence on its overall integrity. The assumption here is that by protecting key natural heritage features and functions, other functions and features will also be maintained.

Determining which features and functions should be included in an assessment of development impacts can be accomplished through a screening process. When undertaking a screening process, it is necessary to:

- identify features and functions most likely to be affected directly or indirectly by the proposal; and

- examine these features and functions and identify those which are of particular concern or could serve as good indicators of impacts.

Key features and functions should:

- be measurable or predictable (i.e., functional loss can be predicted through sampling, modeling, or other accepted methods) (e.g., stream temperature to measure water quality in a cold water stream). Assessment of habitat changes generally are more meaningful than changes in the relative abundance of species utilizing a particular habitat;

- contribute significantly to the integrity or importance of the natural feature or function; and

- have been previously identified as a particularly important feature or function. (However, some key features and functions may be discovered through an assessment of impacts.)

Section 2 describes some of the key ecological functions associated with natural heritage features and areas. Attachment C.3 includes a partial list of possible impacts on features and functions. It is important to note that not all of these functions are likely to occur in every natural heritage area, and that some functions may be present but be relatively unimportant.

Identification of key functions will be based on background information and preliminary work. Other functions may be added if important ones have been overlooked. The final list of key functions will focus the investigations.

ii) Identifying Ecological Linkages, Processes and Study Area Boundaries

Ecological Linkages: A linkage is a pathway, connection or relationship between natural heritage features and areas. The ***natural connections between them should be maintained, and improved where possible*** (PPS, Section 2.3.3) The importance of linkages in maintaining ecological functions is an important consideration in assessing potential development-related impacts.

Aquatic linkages include intermittent and permanent watercourses, water bodies and wetlands in the study area. Aquatic linkages can be defined using topographic information, analysis of aerial photographs, water chemistry data and fish community and aquatic habitat assessment data. Permanence of flow and surface and subsurface gradients relative to other aquatic and terrestrial habitats will provide information about the importance of connections between surface and groundwater in maintaining fish and aquatic habitat.

Terrestrial linkages are generally areas linking woodlands, valleylands, wildlife habitats or other features and may be described in terms of their characteristics (width, length and vegetation) and functions.

Natural Processes: Processes may be chemical, physical or biological. Movement of surface and groundwater and their associated chemical characteristics are examples of physical or hydrological processes. Other examples include flow augmentation and erosion. Nutrient cycles are chemical processes. Biological processes may include succession and decomposition.

Study Area Boundaries: The study area should include the development parcel and those parts of the adjacent lands and significant natural heritage features or areas potentially affected by the development. A site visit may be necessary to determine the boundary of the features and adjacent lands. It is suggested that the proponent and planning authority agree on the study area boundaries at the outset of the impact assessment.

iii) Determining Information Needs and Availability of Information

This involves assessing the existing available secondary source information and the means to acquire this information. There may also be gaps in the available information required to undertake an impact assessment. Methods for dealing with these information gaps should be assessed and/or the implications of these data gaps for assessment should be considered. Other considerations include any needs for field investigations and assistance from outside consultants with specialized expertise.

iv) Determining if Additional Information or Studies are Needed

The level of detail needed to complete a review of development impacts will vary, depending on the characteristics of the site and the proposed development. In some situations, a very detailed assessment may be necessary, while in others a more limited assessment will suffice.

All impact assessments, regardless of the level of detail, should be based on a clear understanding of the undertaking and the environment, the potential impacts on key features and functions and possible mitigation measures.

Less detailed assessments of development impacts may be appropriate where:

- proposed developments are expected to result in minimal impacts on natural heritage resources; and/or
- the expected impacts can be readily mitigated.

A sample checklist for these assessments is provided as Attachment C.4.

A more detailed assessment may be appropriate where:

- the potential impacts of an undertaking are unknown;
- impacts on natural heritage resources are likely; and/or
- appropriate impact mitigation techniques may not be readily available.

The level of detail of an impact assessment reflects not only the significance of the natural heritage features, but also the planning stage for the proposed development. For example, a community or secondary plan may require a less detailed impact assessment since the details of the proposed development are only conceptual at this planning stage. More detailed assessments are conducted at a site-specific level and are more definitive in the identification of impacts and the development of mitigation measures. Generally, more detailed and definitive impact assessments are possible when more information is available on both the natural heritage features and areas and the proposed development.

In some situations where natural heritage system planning exercises have been completed (see Section 3), the need for a detailed assessment may be reduced, and a more focused assessment may provide an adequate evaluation of potential impacts.

Regardless of the assessment undertaken, the level of detail must be sufficient to ***demonstrate that there will be no negative impacts on the natural features or on the ecological functions for which the area is identified.***

5.2.4 Assess Potential Impacts

Attachment C.3 provides examples of potential impacts associated with various development activities, and some possible mitigation techniques. Although the assessment of potential impacts should be quantitative, there are some situations where this will not be possible. Impacts may be direct (e.g., woodland cutting/clearing) or indirect. Examples of indirect impacts include reduction in forest interior habitat due to fragmentation or loss of forest edge, human disturbance, invasion by non-native species and the effects of noise on wildlife.

A number of factors should be considered in assessing potential impacts, including:

- the spatial extent, magnitude, frequency and duration of the impacts;
- the extent and degree to which adjacent lands will be affected;
- whether the impacts are likely to result in cumulative impacts; and
- potential impacts on specific features and functions.

For information on assessment of cumulative impacts, refer to Bedford and Preston 1988; Cocklin et al 1992; Davies 1991; and Leibowitz et al 1992.

5.2.5 Identify Mitigation Measures

Mitigation involves implementing measures to avoid or reduce negative impacts. The implementation of mitigation measures is the responsibility of the proponent. The proponent should demonstrate that the mitigation measures themselves will not result in ***negative impacts on the natural features or on the ecological functions for which the area is identified.*** Attachment C.3 provides some examples of potential development impacts and some possible mitigation measures.

Whenever a project may have negative impacts on fish habitat (i.e., will cause an alteration of habitat), the proponent should consult the Department of Fisheries and Oceans (DFO) concerning habitat protection. DFO will advise as to whether the project is likely to harm fish habitat and, if so, what measures could be taken to avoid or reduce the damage so as to comply with the *Fisheries Act* (Canada). In some cases, it may not be possible to protect fish habitat. In such cases DFO may authorize the harmful alteration, disruption or destruction of fish habitat under Section 35 (2) of the *Fisheries Act*. Authorizations are conditional, that is, DFO requires that acceptable compensation be provided (e.g., replacement of damaged habitat) in order to ensure there is no net loss of habitat as a result of the project.

Residual impacts (i.e., those impacts remaining after mitigation measures have been implemented), if any, must be identified. It is recommended that the assessment of residual impacts consider whether there is the potential for cumulative impacts resulting from the development.

It is also recommended that the impact assessment conclude with a statement indicating whether or not the proposed development will have any ***negative impacts*** on ***the natural heritage features or on the ecological functions for which an area is identified.***

5.2.6 Identify Monitoring Needs

The impact assessment may identify monitoring needs that may be considered as part of the planning authority's decision (Section 5.2.8). There are two main types of monitoring - compliance monitoring and effectiveness monitoring.

Planning authorities may undertake compliance monitoring to ensure that the proponent has implemented all mitigation measures identified in the impact assessment and that the measures are performing as predicted. Monitoring may be undertaken before, during and after construction.

Monitoring programs may be established as a condition of approval. This provides planning authorities with an opportunity to review monitoring results before proceeding with subsequent phases of a development, in accordance with appropriate conditions of approval. Examples of such conditions could include:

- adoption of planning and/or regulatory instruments such as zoning, site plans or development agreements; and
- completion of certain structural works in accordance with accepted standards.

The purpose of effectiveness monitoring is to determine the adequacy of the mitigation measures identified in the impact assessment, relative to avoiding ***negative impacts***. Such monitoring may be appropriate where:

- there is uncertainty as to the effectiveness of established mitigation measures to avoid ***negative impacts***; and
- new and untested mitigation measures are used.

In some cases, long-term monitoring programs may be required, particularly for impacts on surface or groundwater quality or quantity. Remedial steps are undertaken where the results of monitoring indicate that actual impacts are greater than predicted impacts.

5.2.7 Review of Assessment

The proponent submits an impact assessment to the planning authority that is the approval authority for the assessment. Planning authorities review the assessments to determine if they are acceptable, for example, in terms of the mitigation measures and monitoring programs that are identified. They may request that further information be provided or alternative mitigation and monitoring measures be considered. The OMNR and other agencies may be consulted regarding technical aspects. Public input and review of the document may also be integrated into the process. For example, if a planning authority has an Environmental Advisory Committee (EAC) or similar group, this committee may be involved in the review of the assessment of impacts.

The planning authority's review of impact assessments can be facilitated by using a form to determine if all issues have been adequately addressed (see Attachment C.4). The impact assessment should be reviewed by the planning authority for completeness and technical accuracy.

5.2.8 Planning Authority Decision

In making its decision, the planning authority would consider the results of the review, along with other planning-related matters. The planning authority's decision can be contingent on the revision of the development proposal and/or the attachment of conditions. For example, approval may be contingent upon the implementation of specific mitigation and/or monitoring measures. Alternatively, approval may be granted only after more extensive revisions.

Several types of decisions may be made:

- acceptance of the development application;
- revisions to the proposed development to avoid impacts that the planning authority deems unacceptable;
- conditions of approval to address agreed-upon issues in more detail or to address new issues raised during the assessment process; or
- no approval.

In situations where mitigation measures can not prevent ***negative impacts on the natural features or on the ecological functions for which the area is identified***, an application should not be approved.

6. PERFORMANCE INDICATORS

Paragraph 6 of Part IV - Implementation/Interpretation of the Provincial Policy Statement (PPS) notes that:

> ***The Province, in consultation with municipalities, will identify performance indicators for measuring the effectiveness of some or all of the policies, and will monitor their implementation. Municipalities are encouraged to establish performance indicators to monitor the implementation of the policies in their official plans.*** (PPS, p. 11)

A wide range of performance indicators to measure the successful implementation of the natural heritage policy may be considered by planning authorities. In their simplest form, performance indicators may be considered with respect to particular features and areas identified in planning documents. Performance indicators may measure the degree to which identified and evaluated natural heritage features and areas are addressed by policies and schedules in planning documents and the extent to which the planning authority has implemented methods to assess the possible negative impacts of development on these natural heritage features and areas.

Specific performance indicators may include:

- the total extent of woodlands, wetlands and other naturally vegetated areas in a planning area;
- the percentage of these features that are identified for protection or restoration in planning documents; and
- the change in area (loss or gain) of these features that is attributable to planning authority decisions over a specific period of time.

Planning authorities may wish to implement other more specific performance indicators where resources or situations permit. For example, techniques such as remote sensing, cumulative impact assessment or computer-based information management techniques may be used to measure the changes. Other specific natural heritage features, such as threatened and endangered species and wildlife habitats, may be the subject of particular local performance indicators with respect to the extent or amount of such species or habitats.

The Province is working with planning authorities to help in the development of indicators that fit the needs of the local planning environment.

Several excellent publications have been prepared on identifying and implementing effective performance indicators, including those listed in Section 7.4.

In developing performance indicators, planning authorities are encouraged to work closely with the local OMNR and conservation authority offices. They usually have information and expertise that will be useful in describing and monitoring performance indicators. Planning authorities may work with these agencies to develop common data collection and monitoring standards so that information can be most effectively shared and compared.

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APPENDIX A

NATURAL HERITAGE FEATURES AND AREAS

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NATURAL HERITAGE FEATURES AND AREAS

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Attachment A.1

A Recommended Approach for the Identification of the Significant Portions of the Habitat of Endangered and Threatened Species

Where the planning authority has determined that a development proposal may impact on the habitat of an endangered or threatened species: and

1. ***Where a recovery/management plan has been prepared for an endangered or threatened species.***

   Identify the location, size, amount, configuration and quality of the habitat requiring protection, in accordance with specifications in approved recovery/management plans for endangered and threatened species. This can be accomplished by implementing the relevant habitat protection sections of the approved recovery/management plan in the area to which to development proposal applies.

   The following is a recommended approach:

   - Obtain from OMNR and other sources names of experts familiar with the habitat requirements of the species, for purposes of ensuring proper site-specific interpretation and application of the protection requirements set out in recovery/management plans;
   - Consult with OMNR and/or experts with respect to the location, size, amount, configuration and quality of habitat to be protected. In the case of species in regulation under the *Endangered Species Act*, OMNR will identify or confirm the habitat to be protected (i.e., the ***significant portions of the habitat***);
   - Designate the habitat of the endangered or threatened species in an appropriate zoning category that ensures no development or site alteration.

AND

The appropriate OMNR District or Area office will cooperate with the planning authority by:

- Participating in site visits organized by the planning authority to identify significant portions of the habitat of endangered species and, as time permits, threatened species (with the landowner's permission);
- Notifying the planning authority during consultation whether the location, size, amount, configuration, and quality of habitat identified as requiring protection will conform to the specifications set out in recovery/management plans for endangered and threatened species;
- Providing advice to the planning authority, as required, to facilitate compliance with the provisions of the *Endangered Species Act*.

OR

2. ***Where a recovery /management plan has not been prepared for an endangered species protected in regulation under the Endangered Species Act***:[1]

   Identify the location, size, amount, configuration and quality of the habitat requiring protection, in a manner that does not result in contravention of the *Endangered Species Act* by:

   - Consulting with OMNR District or Area staff ;
   - Designating the habitat of the regulated endangered species, as identified or confirmed by OMNR or a delegate of OMNR, in an appropriate zoning category that ensures no development or site alteration.

   The appropriate District or Area office of the OMNR or a delegate of the Ministry will identify or confirm the location, size, amount, configuration and quality of the habitat requiring protection by:

   - Contacting the regional COSSARO representative for names of experts familiar with the habitat requirements of the species in a field setting;
   - Consulting information on file in OMNR District or Area offices to determine the extent of the habitat identified as requiring protection at the time the species was listed in regulation under the *Endangered Species Act*. Landowner notification of the amount of habitat to be protected normally takes place

prior to listing;

- Contacting the landowner to obtain permission for a site visit, including permission for experts who are not employees of provincial or municipal governments. Note that it is desirable for the landowner to be present during the site visit, so that the significant features may be shown to the landowner;
- Determining, during the site visit, the location, size, amount, configuration and quality of the habitat to be protected. If this task cannot be completed in a single visit, obtain landowner's permission for subsequent visits;
- Determining, during the site visit, whether the size of the population or distribution at the site has changed since previous communications with the landowner and since previous authorized site visits. If the amount of habitat requiring protection has changed, an explanation will be given to the landowner.
- Providing detailed maps of the habitat(s) to be protected to the landowner, the planning authority, and NHIC.

OR

3. ***Where a recovery/management plan has not been prepared for a threatened species:***[1]

Identify the location, size, amount, configuration and quality of the habitat requiring protection by implementing habitat identification and protection measures in the area to which the development proposal applies. This can be accomplished by:

- Obtaining from OMNR and other sources names of experts familiar with the habitat requirements of the species;
- Consulting with OMNR and non-government experts with respect to the location, size, amount, configuration and quality of the habitat to be protected, and any other relevant considerations;
- Providing detailed maps of the habitat to be protected to the landowner. It is recommended that copies of such maps be forwarded to the local OMNR office.
- Designating the habitat of the threatened species in an appropriate zoning category that ensures no development or site alteration.

The appropriate District or Area office of the OMNR will cooperate with the planning authority by:

- Providing available information requested by the planning authority (e.g., status reports, scientific literature);
- Participating, if time permits, in site visits, as requested and organized by the planning authority, and with the landowner's authorization;
- Providing advice, as requested by the planning authority, to facilitate identification and protection of habitats of threatened species.

[1] If unsure whether a recovery plan exists, District or Area offices of OMNR should consult the regional COSSARO representative for advice. This is important as a recovery team may have been formed, and a plan may be in preparation. Alternatively, a status report or management guideline may be available for the species. Copies of status reports, recovery/management plans and the *Endangered Species Act* can be obtained from OMNR local offices.

Attachment A.2

A Recommended Approach for the Evaluation of Fish Habitat - Broad Scale

Characteristics	What Does It Mean?	How To Measure?
Fish Community – the species and life stages of fish present in a waterbody, including:		
• threatened or endangered species	• presence of such species indicates a need for a high level of protection	• presence/absence of threatened or endangered fish species
• species with specific or stringent habitat requirements (e.g. lake trout)	• more detailed habitat evaluations may be required at the site level to determine the types and locations of habitats that might be impacted by proposed developments	• presence/absence of species with specific or stringent habitat requirements
• species sensitive to the potential impacts of development (e.g. removal of shade, erosion and sedimentation)	• knowledge of the species and life stages that use an area and their habitat requirements can be used to help assess habitat quality, its sensitivity and protection requirements	• presence/absence of species and life stages sensitive to potential impacts of development
Thermal Regime – the temperature of a waterbody or portion of a waterbody		
• coldwater waterbodies contain salmon, trout, whitefish and/or sculpin species, or contain coldwater benthic invertebrate species, or have thermal characteristics of a coldwater lake or stream (OMNR, 1998a) • coolwater waterbodies contain a fish community dominated by percids, esocids or other coolwater species, or have thermal characteristics of a coolwater waterbody • warmwater waterbodies contain a fish community dominated by centrarchids, cyprinids or other warmwater species, or have thermal characteristics of a warmwater waterbody	• helps to predict the nature of the potential fish community present • indicates thermal tolerance of fish species present • indicates sensitivity of fish habitat to certain development activities (e.g., removal of riparian vegetation) • may indicate presence of ground water discharge • indicates general level of stormwater management required (OMOEE, 1994)	• identify fish or benthic invertebrate species present, or measure water temperature in summer (Stoneman and Jones, 1996).

Characteristics	What Does It Mean?	How To Measure?
Headwater		
• source of water at the top of a drainage system, including: (a)springs, (b) seepage areas, or (c) areas of ground water upwelling • first order streams (streams at top of drainage system; two first order streams join to form a second order stream, etc.) • headwater lakes	• indicates area of ground water discharge • indicates potential for brook trout spawning habitat • a source of water and nutrients for fish habitat downstream • indicates presence of critical habitat requiring a high level of protection	• number/area of springs, seepage areas, and areas of ground water upwelling • determine stream order and headwater lakes from topographic or other maps
Geology -- characteristics of soils and bedrock surrounding a waterbody • granular or non-granular soils • permeable or non-permeable bedrock	• indicates potential for surface runoff and erosion • indicates potential for aquifers and ground water discharge • indicates potential of a waterbody to support coldwater fish species that rely on ground water discharge	• identify from Quaternary and Surficial Geology maps (OMNDM) and Engineering Geology Terrain maps
Lake at development capacity		
• a lake trout lake that cannot support further shoreline development because of habitat concerns identified through phosphorus and dissolved oxygen modeling or measurements	• a lake trout lake may already be at development capacity based on nutrient/fish habitat concerns • any further development will cause a loss of fish habitat unless special servicing arrangements can be made to ensure the lake receives no additional nutrient loading	• information on lakes at development capacity is available from OMOE, OMNR and/or the local municipality. • information on determining development capacity and servicing alternatives is available from MOE
Waterbody of special concern		
• a waterbody of concern with respect to development because of unique fisheries values or environmental concerns	• indicates a waterbody that provides unique fish habitat or a unique fish community, or for which significant environmental concerns have been identified (e.g., Lake Simcoe) •	• identify waterbodies with unique fish habitat or fish community • identify waterbodies for which significant environmental concerns have been identified (e.g., through a fisheries or environmental management plan or strategy) •

Attachment A.3

A Recommended Approach for the Evaluation of Fish Habitat - Detailed Scale

Characteristics	What Does It Mean?	How To Measure?
Ecological Functions – includes the provision of: • spawning, nursery and rearing habitats; • food supply; • cover, thermal refuges • migration routes; • hydrological functions; and/or • linkages between aquatic and terrestrial ecosystems (including adjacent land).	• indicates capability of habitat to meet life requirements of fish species and life stages present • interface between ground and surface waters (ground water discharge/ recharge) • riparian and shoreline areas may help to buffer impacts of adjacent land use • provides for baseflow, flood flows • helps to determine habitat type and protection requirements • indicates need/potential for habitat rehabilitation	• presence of one or more life stages of fish (by species) • abundance of suitable spawning substrates, rearing areas, and/or food organisms • presence of open migration routes • number of discharge and/or recharge areas • volume/timing of baseflows, flood flows • species/abundance of riparian and/or aquatic vegetation
Contribution to Fish Productivity • the degree to which a habitat contributes (or could potentially contribute) to habitat productive capacity	• productive capacity is the maximum natural capability of habitats to produce healthy fish or to produce aquatic organisms upon which fish depend • habitats vary in natural productivity depending on their quality, quantity and other factors; some produce more fish and/or aquatic organisms (and more species diversity) than others • fish production is usually limited by the quality and/or quantity of one or more habitat features (e.g., spawning or feeding areas), among other factors • helps to determine habitat type and protection requirements	• identify habitat requirements of fish species and life stages present • identify factors limiting production of local fish populations • measures of habitat quality include: (a) substrate composition, (b) species and abundance of aquatic plants, (c) presence of shade and cover, (d) presence of riffles and pools, and (e) water quality, including temperature • measures of habitat quantity include: (a) areal extent of suitable spawning, nursery and/or feeding habitats, (b) number/area of springs, seepage and/or upwelling areas, (c) water depth, flow, and (d) abundance of riparian (including overhanging) vegetation
Sensitivity to Development • the tendency of fish habitat to be negatively impacted by development	• helps to determine habitat type and protection requirements • sensitivity is a function of numerous factors, including: (a) the nature of the development activity (e.g., clearing vegetation, paving), (b) the habitat requirements of fish species and life stages using the habitat, (c) loss of function due to perturbations (e.g.,	• identify specific development activities proposed • identify habitat requirements of fish species and life stages present • assess current habitat conditions • identify potential impacts on habitat resulting from development

Characteristics	What Does It Mean?	How To Measure?
	sedimentation) , and (d) duration of impacts and reversibility through natural processes (e.g., currents)	
Scarcity of Habitat		
• the relative abundance of similar habitats (e.g., aquatic vegetation, spawning areas)	• indicates availability of certain habitats to fish • helps to determine habitat type and level of protection required	• assess quality and quantity of similar habitats in the same waterbody or watershed
• habitat of endangered and threatened fish species	• requires a high level of protection	• identify habitat used by endangered or threatened fish species

Attachment A.4

A Recommended Approach for the Evaluation of Significant Woodlands

Suggested Factors	Implications	Suggested Standards
1. Woodland Size	• the areal extent of the woodland (irrespective of ownership) • woodland areas are considered to be generally continuous even if intersected by standard roads (e.g., 21m (69') wide).	Where woodlands cover: • is less than 5% of the land cover, woodlands 2 ha in size or larger should be considered for significance • is between about 5% to 15% of the land cover, woodlands 4 ha in size or larger should be considered for significance • is between about 15% to 30% of the land cover, woodlands 40 ha in size or larger (preferably 300 metres in minimum width) should be considered for significance • occupies more than about 30% of the land, a minimum size is not suggested - consider other factors
2. Ecological Functions a) Woodland Shape and Proximity (to Other Woodlands or to Other Habitat Types)	• narrow woodlands contain more edge habitat and less interior habitat than rounder or block-shaped woodlands • woodland patches that are close to each other are of more value to wildlife than more distant patches	• in areas where interior habitat is in limited supply, and/or where forest interior dependent species are declining, select woodlands that provide more interior habitat if choosing between similar sized woodland blocks • when choosing between woodland patches of similar size, choose patches that are in close proximity to other patches
b) Linkages	• linkages to other natural heritage features or areas, to waterbodies, or to other woodlands are important • overlaps with other natural heritage features or areas • provides habitats and/or corridors for movement between habitats • connects other natural heritage features or areas	• woodlands with one or more natural heritage features or areas within their boundary • woodlands which overlap with other natural heritage features and areas • woodlands that have the potential to form a link between another natural heritage feature or area, water or another woodland, or where an opportunity exists to restore linkages to adjacent areas • woodlands that occupy a substantial portion of a watershed • woodlands that are in, close to, or adjacent to, a groundwater discharge, recharge or headwater region
c) Woodland Diversity	• several vegetation community types, age compositions, etc., are more valuable as wildlife habitat	• when choosing between otherwise similar woodlands, select those which are of higher diversity

Suggested Factors	Implications	Suggested Standards
	than less diverse woodlands	
3. Uncommon characteristics	• woodlands that are uncommon in terms of composition, cover type, quality, age and age structure should be protected • older woodlands (i.e., woodlands greater than 100 years old) are particularly valuable for several reasons	• unique composition, age, or site quality represented by less than 5% of the woodland area in a planning area • for uncommon woodland types, planning authorities should try to maintain historically (or if unavailable, current) representative amounts of these woodland communities • older woodlands should be protected
4. Economic and Social Values	• woodlands that are actively managed to stimulate canopy gap replacement dynamics may preserve historical ecological functions that operated in the pre-settlement forests of southern Ontario • management, by selectively thinning of conifer plantations, can encourage succession to native hardwood forests • management may also encourage regeneration of more shade tolerant tree species and/or discourage invasion by exotic species	• maintain woodlands that are subject to long term forest management agreements

Attachment A.5

Wildlife Use of Various-Sized Habitat Patches

Patch Size	Forest	Marsh	Grassland and Savannah
1 ha	• Common mammals (grey squirrel) • Common birds (Blue Jay, American Crow) • Some forest birds (Black-capped Chickadee, Eastern Wood Peewee, Common Grackle)	• Small muskrat populations • Common birds (Red-winged Blackbird, Canada Goose, Mallard) • Common amphibian and reptile species (such as Green Frog and Painted Turtle)	• Variety of wildlife generalist species, none of which are dependent on grasslands
4 ha	• May support a very few common edge birds, e.g., Downy Woodpecker, Great Crested Flycatcher • Eastern Chipmunk may be present	• Similar species as above, but may also support Bullfrog	• Common grassland species may be present (Meadow Vole, Short-tailed Shrew)
10 ha	• Still dominated by edge species • May have small areas of interior which support small numbers of forest interior and edge species, e.g., Hairy Woodpecker, White-breasted Nuthatch • May be large enough to support some species of salamander	• May support American Wigeon, Marsh Wren	• May support some common grassland birds (Savannah Sparrow, Eastern Meadowlark)
30 ha	• May support small populations (1-2 pairs) of forest interior birds (i.e., Winter Wren, Brown Creeper, Black-and-white Warbler) • Area-sensitive species (Veery) may be present	• May support similar marsh bird species as above plus possibly Black Tern	• Supports most Ontario grassland mammals and a few more bird species (Upland Sandpiper, Bobolink)
50-75 ha	• Still predominantly edge, but will support small populations of most birds except those with very large home ranges	• Least Bittern may be present in marshes of this size	• More bird species (Northern Harrier, Short-eared Owl)
100-400 ha	• May support all forest-dependent bird species • Many will still be in low numbers and may be absent if there is no nearby suitable habitat • Woodland Jumping Mouse may be present	• May support small numbers of diving ducks (Redhead, Canvasback, Ruddy Duck)	• May support grasslands dependent Henslow's Sparrow
1,000 ha	• Suitable for almost all forest birds • Some forest-dependent mammals present, but most still absent	• Supports all marsh species, although some may still have small populations	• Supports almost all grassland species, but may still be inadequate for Sharp-tailed Grouse and Greater Prairie-Chicken

Adapted from: Table 4 - Wildlife Use of Various Sized Habitats, in:
Environment Canada, Ontario Ministry of Natural Resources and Ontario Ministry of the Environment. 1998. A Framework for Guiding Habitat Rehabilitation in Great Lakes Areas of Concern. Canada - Ontario Remedial Action Plan Steering Committee. March 1998. 76 pp.
Note: The table assumes maintenance of viable populations. Many of the species listed in the table may occasionally occur in smaller patches but self-sustaining populations are usually associated with the patch sizes indicated in the table, or with larger areas.

Attachment A.6

Recommended Information Sources for Areas with High Diversity

Source of Information	
Plants	• ANSI site district reports, available from OMNR local offices, provide a description of all significant and candidate ANSI's in the site district. Candidate sites with exceptionally high diversity of species may be identified. Plant and animal inventories may be available for some sites. • The ELC for southern Ontario (Lee et. al., 1998), available from OMNR (London), has detailed data on over 800 forest plots. Data include species lists; percent cover by species; survey of plants in the surrounding stand. . • Many wetland evaluations, available from OMNR local offices, include partial lists of plant species. • Some naturalist groups have undertaken inventories of plants in some of their local natural areas. These inventories often highlight sites of high plant diversity. Contact OMNR offices, Conservation Authorities, Federation of Ontario Naturalists (FON), etc. • Consultants often conduct inventories as part their studies for proposed developments. Many of these reports are an excellent source of information. Contact planning authorities, OMNR, MTO, Ontario Hydro, etc.
Breeding Birds	• Cheskey (1995) (see Ontario Breeding Bird Atlas pg. 25) mapped areas of species richness of breeding birds based on the distribution of birds in Breeding Bird Atlas squares. • Ontario Breeding Bird Atlas (Cadman et. al., 1987) and the Breeding Bird Survey (Speirs, 1985). Breeding bird atlas data were collected for 10 by 10 km squares. Squares with high species richness can be identified. Members of local naturalist clubs may be contacted for more site specific information. • Forest Bird Monitoring Program (Mike Cadman, CWS, Guelph); Long Point Bird Observatory (LPBO)/Bird Studies Canada Forest Bird Monitoring Program (Austen et al 1994) gathers information on nesting birds. The FBMP covers 150 sites across southern and central Ontario. • Breeding Bird Survey (Environment Canada, Hull): survey routes are driven annually and sites with a high diversity of species may be noted. • Marsh Monitoring Program relies on volunteers to estimate the number of species and abundance of wetland birds in selected marshes. Contact LPBO
Amphibians and Reptiles	• Ontario Herpetofaunal Survey (OHS) Oldham (1996): starting point for identifying sites with high diversity of amphibians and reptiles. OHS data are collected by volunteers and are often based on single site visits. Survey effort is variable. Contact NH IC, OMNR, Peterborough. • Amphibian Backyard Survey Program - may help identify wetlands with a high diversity of amphibian species. Information is collected by local naturalists. Contact CWS and LPBO. • Marsh Monitoring Program: volunteers estimate the number of species and abundance of amphibians in selected marshes. Contact LPBO.

Attachment A.7

A Recommended Approach for the Evaluation of Significant Valleylands

Suggested Factors	Implications	Suggested Standards
1. Prominence as a distinctive landform	• Large, well-defined, valleylands are often defining landscape features essential to the character of an area	• Define boundaries on the basis of standard procedures such as those defined in Natural Hazards Manual.
2. Degree of Naturalness	• Valleylands that are relatively undisturbed have greater natural heritage value than disturbed valleylands • Valleylands that have a high proportion of natural vegetation cover also help buffer waterbodies from the effects of urban development	• Degree of fragmentation (high to low) • Proportion of length of valleyland with continuous natural vegetative cover (high to low) • Proportion of area of valleyland area with continuous natural vegetation cover (high to low) • Proportion of vegetative cover that is natural vs, cultural (e.g., golf course, landscaped park land, agricultural field) (high to low) • Floristic Quality Assessment score (Oldham et al., 1995)
3. Ecological Functions	<u>Habitat Value</u> • Undisturbed valleylands are more valuable to wildlife than disturbed valleylands <u>Linkage Function</u> • Valleylands provide linkages to the rest of the watershed, and to other natural areas; help maintain important hydrologic functions; provide important corridors allowing the movement/dispersal of plants and animals	• Relative importance of valleylands as habitat for fish and wildlife (high to low) • Species and (wildlife) community diversity (high to low) • Degree of connection with rest of watershed (high to low) • Degree of connection to, or overlap with, other natural heritage features and areas (high to low) • Value as wildlife corridor (high to low)
4. Restoration Potential	• Valleylands that have been altered extensively and cannot be restored are less valuable than those which can be restored • Restoration should be considered especially if natural linkages can be restored	• Restoration is possible (difficult to simple) • Community is interested in restoration (high to low) • Ownership facilitates restoration (yes, no)
5. Historical-cultural value	• Some valleylands are particularly important for cultural/socio-economic reasons	• Develop local factors

Attachment A.8

A Recommended Approach for the Evaluation of Seasonal Concentration Areas (Significant Wildlife Habitat)

Specific Habitat	Key Contacts and Factors	Suggested Standards

White-tailed Deer – wintering habitats	OMNR
	• relative importance of deer yard to local deer population
	• deer population size
	• deer yard size
	• historical use
	• importance of the deer population to local residents and economy
	• needs and potential concerns of planning authority (e.g., urban versus rural i.e., deer/vehicle collisions, crop damage, damage to native vegetation of concern (e.g., Rondeau and Pinery parks)
	• aggregations of small yards as compared to a few large yards
	• OMNR management objectives for Wildlife Management Unit deer population
		• Local OMNR will know the locations of most deer yards, including aggregations of small yards.
		• Local OMNR staff can be consulted for the identification and evaluation of winter deer yards and to assist with the development of appropriate strategies for their protection. Factors to consider include:
		  • yard has a long record of historical use (e.g., more than 10 years)
		  • yard is very important to the area deer population (e.g., few other yards in the immediate area)
		  • amount and distribution of conifer cover in the planning area
		  • the size of the yard, bigger is usually better although the importance of size depends on the area (e.g., a deer yard may need 500 deer in some areas to be significant, whereas a deer yard with 50 deer in another area may be highly significant)
		  • deer population is important to the local economy for hunting and viewing
		  • importance of winter deer habitat to other wildlife species
		  • OMNR deer population management objectives for the local population (i.e., to maintain, increase or decrease the population) including past management efforts
		  • current policy support for the protection of winter deer habitat in existing planning documents
		  • in areas where there are no clearly identifiable large yards, but instead several aggregations of small yards that collectively are very important, OMNR can be contacted for advice on protection (e.g., zones may be established within which OMNR is contacted for advice on development proposals)

Colonial bird nesting sites	OMNR, CWS, Long Point Bird Observatory/Bird Studies Canada, Federation of Ontario Naturalists, local naturalist clubs • sensitivity of the species • number of nests in the colony • relative importance of nesting colony (e.g., number of other colonies in area) • amount of available habitat for the species in the planning area • representation of the species in the planning area • historical use of a nesting site • size of habitat containing the nesting colony • amount of disturbance of the site	For the evaluation and ranking of colonial bird nesting habitat, greatest priority is usually given to: • sites for provincially vulnerable species • sites with a high number of nests • sites with historical use (more than 5 years) • permanence of the site (i.e., is the site changing through natural processes so that it will be unsuitable in the future, i.e., trees falling down for tree nesting species) • species representation in the planning area (i.e., poorly represented species should have higher priority) • the least disturbed sites (absence of buildings, roads, etc.) Evaluation of the significance of colonial nesting sites is influenced by the management objectives of the OMNR and the Canadian Wildlife Service. The following is a list of the number of nests, by species, recommended as being a significant colony. If a species is rare or poorly represented in the province (indicated by a superscript) or there is very limited habitat, all colonies may be considered significant. Also, the significance of the number of nests in a colony varies from area to area and depends on the representation of the species in that area and management objectives. • Great Blue Heron (25); Black-Crowned Night Heron[2] (25); Great Black-backed Gull[2] (5); Herring Gull (100); Bonaparte's Gull (10); Little Gull[2] (1); Great

Specific Habitat	Key Contacts and Factors	Suggested Standards
		Egret[2] (5); Caspian Tern[1] (75); Common Tern (100); Black Tern[1] (10); Forster's Tern[2] (5 - for areas outside of Lake St. Clair); Green Heron (10); Bank Swallow (100); Cliff Swallow (8); Northern Rough-winged Swallow (10); Yellow-headed Blackbird[2] (10); Brewer's Blackbird (5). Species marked with a [1] are designated as vulnerable species in Ontario in the December 1996 VTEEE list (OMNR). Species with a [2] are identified as rare by NHIC.
Waterfowl Habitat • sites known and mapped	OMNR, Canadian Wildlife Service, Ducks Unlimited, Wildlife Habitat Canada and Conservation Authorities • Locations of significant waterfowl habitat that are known and mapped are listed in the next column	• Long Point, Lake St. Clair, Walpole Island marshes, Lower Detroit River, Wolfe Island wetlands, Hillman/Point Pelee, Rondeau Bay, Amherst Island wetlands, St. Lawrence River, Hullet Provincial Wildlife Area (PWA), Luther Marsh (PWA), Minesing Swamp, Tiny Marsh (PWA), Matchedash Bay (PWA), Wye Marsh (PWA), Lake St. Francis, Prince Edward County shoreline, Presqu'ile Bay, Lake Scugog, Cache Bay, West Rainy Lake, Lake of the Woods, Little Claybelt, Nighthawk Lake, Holland/Scanlon Marshes, Coots Paradise. • Ramsar sites (note: not all are waterfowl areas)
Waterfowl Habitat • sites not mapped • based on population status	OMNR, CWS, Ducks Unlimited, Conservation Authorities Habitat for: a) species whose populations are in decline b) species for which Ontario provides a large portion of the continental breeding and staging habitat c) species for which Ontario provides an important component of continental breeding and/or staging habitat d) species for which breeding, staging and wintering habitat is limited in Ontario e) species that are dependent on transitory habitats	Applicable species or populations (based on 1995 data) a) Black Duck; South James Bay and Atlantic populations of Canada Goose. For municipal planning, habitat for Black Duck may be applicable; greatest priority would be for known nesting and brood habitat for Black Duck. b) Hooded Merganser, Common Goldeneye, Ringnecked Duck, Scaup (2 species), Old Squaw, Scoters (3 species), Mississippi Valley and southern Ontario populations of Canada Goose. Most of these species either nest in northern Ontario or have strong populations (e.g., southern Ontario Canada Goose). c) Coot, Wigeon, Gadwall, Blue-winged Teal, Green-winged Teal, Lesser Snow Goose, Mallard, Wood Duck, Merganser (2 species). All nesting sites for Gadwall, Green-winged Teal and Wigeon would be a high priority, because they are uncommon nesters in Ontario. Each planning area could protect a good representation of Mallard and Wood Duck habitat because these species are of high economic value. Canvasback and Redhead have very important staging sites on the lower Great Lakes. d) Ruddy Duck, King and Common Eider, Trumpeter Swan, Atlantic Brant. Ruddy Duck and Trumpeter Swans would the two species most applicable to municipal planning, the others are more northern species; protect all known nesting habitat for these two species e) Pintail, Tundra Swan and Shoveller. All known nesting habitat for these species is a priority.
Waterfowl habitat • Unmapped • Based on landform type	OMNR, CWS, Ducks Unlimited are sources of information. • The following are criteria for identifying and evaluating waterfowl habitat based on landform. OMNR and CWS can be consulted for information on specific locations. • Four landform types are considered: a) Wetlands	<u>Wetlands</u> • Type of wetland: marshes and swamps have greater value to waterfowl than bogs and fens (wetlands are typed according to the OMNR wetland evaluation system) • Size of wetland: small wetlands are important for waterfowl production, especially groups of wetlands (see below), however as wetland size increases, in most cases, so does the value for waterfowl • Clusters of wetlands (i.e., 10 or more wetlands within 1 km of the centre of each cluster) are more valuable to waterfowl than single small wetlands • Lands next to the wetland: uplands with grass cover (including pastureland) and shrubs provide important nesting habitat and are of greater value to waterfowl than lands that are heavily forested, developed or intensively cultivated. The exception may be that Wood Ducks nest in forested land, although they most often use swamps.

Specific Habitat	Key Contacts and Factors	Suggested Standards
	b) Poorly Drained Landscapes c) NAWMP Project Sites d) Coastal Marshes	Poorly Drained Landscapes • Stream and riverine bottomlands: floodlands provide better habitat for waterfowl than dry uplands, with the exception of uplands next to wetlands that provide nesting habitat • Soils: certain soil types (i.e., the Farmington series) are useful indicators of the best potential waterfowl habitat (depending on the existing land use). Soil types are determined from soil maps or Ontario Land Inventory maps. • Potholes: provide valuable nesting habitat for waterfowl (e.g., terrain with 50 or more potholes per sq. kilometer are considered to be significant waterfowl habitat) • Beaver ponds: provide valuable nesting and feeding habitat (e.g., terrain with 25 or more beaver ponds per 10 sq. km are considered to be significant waterfowl habitat) • Seasonally wet locations: seasonally flooded areas (even those under active cultivation) provide significant pre-nesting habitat. This includes sheetwater or meltwater areas and poorly drained croplands. Seasonally flooded areas are often very important feeding areas. NAWMP Project Sites • Locations selected for enhancement through the North American Waterfowl Management Plan have gone through a rigorous screening process and are considered to be significant waterfowl habitat (e.g., Matchedash Bay and Lake St. Francis) Coastal Marshes • The shorelines and wetlands of the Great Lakes, the St. Lawrence River and large inland lakes provide uncommon and significant habitat for breeding and migrating waterfowl.
Reptiles and Bats • Hibernacula and maternity sites	OMNR, researchers, local naturalist clubs • relative importance to the area population (e.g., number of sites, amount of suitable habitat, rarity of species using the site, etc.) • number of species using a site • number of individuals using a site • size of the habitat in which the site is located • quality of the habitat at the site	When evaluating and ranking hibernation habitat for reptiles and bats, high priority is usually given to: • sites with known traditional use • sites supporting a large number of individuals • sites with rare or uncommon species • sites that are found in or next to large blocks of suitable habitat • reptile hibernacula that have good movement corridors from the winter to the spring and summer habitat Reptiles: There is a lack of data on the locations of hibernacula and on the numbers of reptiles using individual hibernacula that are considered to be significant. Reptiles are further complicated because they often hibernate underground or at the bottom of waterbodies. The best time to assess numbers is when they emerge in the spring (reptiles usually remain near the hibernacula for a period of time before dispersing). Bats: Bats most commonly overwinter in caves or abandoned mines. Suitable sites have above-freezing temperatures and high humidity. The following numbers are based on expert opinion. They are provided as a guideline to reflect relative abundance of the species.

Specific Habitat	Key Contacts and Factors	Suggested Standards		
		Common Name	Maternity Colony	Winter Roost
		Big Brown Bat	30	30
		Little Brown Bat	100	50
		Eastern Pipistrelle	10	20
		Silver-Haired Bat	10	N/A (migrant)
		Long-Eared Bat	10	20
		[1]Small-Footed Bat	10	any site
		[1]The small-footed bat is considered globally rare. As such, all winter roosting sites are considered important.		

NOTE: Please consult OMNR's Significant Wildlife Habitat Technical Guide (OMNR, 1998b) for detailed information on the evaluation of seasonal concentration areas of the following species or groups of species: shorebirds; landbirds; raptors (hawks and owls); wild turkey; turkey vulture; bullfrogs; and butterflies.

Attachment A.9

A Recommended Approach for the Evaluation of Rare Vegetation Communities or Specialized Wildlife Habitats (Significant Wildlife Habitat)

Specific Habitat	Key Contacts and Factors	Suggested Standards
Rare Vegetation Communities	OMNR • degree of rarity	• Highest priority should be given to provincially rare communities (e.g., S1, S2, S3 ranking) identified by the NHIC (Bakowsky 1996). • Consider protecting all prairie and savannah remnants identified in the municipality (these communities are very rare throughout the province). • Next, identify, evaluate and protect vegetation communities that rare in the planning area. The Nature Conservancy has developed criteria for determining local rarity, e.g., communities that represent < 3% of remaining natural area and/or are found in 5 or fewer locations within the planning area could be considered as locally significant communities.
	• diversity of site	• Priority should be given to sites with more than one rare vegetation community, highest plant species diversity, and/or a number of rare species present.
	• condition of community	• Undisturbed or the least disturbed sites are the most significant (e.g., no roads/infrequently used roads; no pollution, forestry operations, grazing). • The highest quality representatives of vegetation communities found in the planning area are most significant. Evaluation criteria could include: fewest number of non-native species; greatest number of community indicator species; greatest number of large trees and/or older age classes.
	• size and location of site	• The largest sites and sites that are part of large natural areas generally are most significant.
	• potential for long-term protection of the site	• Sites providing the best opportunity for long-term protection are most significant.
	• level of threat	• Accord higher significance to currently or potentially threatened rare communities.
	• provision of wildlife habitat	• Vegetation communities providing wildlife habitat are more significant than those that do not (wildlife habitat could include hunting areas for raptors; nesting areas for waterfowl/grassland birds; forging areas for shorebirds; food sources for rare butterflies).
Specialized Habitats note: For a more detailed description of suggested criteria and standards, please refer to the Significant Wildlife Habitat Technical Guide (OMNR, 1998b) *	OMNR • habitats that provide a specialized function for all or part of the life cycle of certain species (e.g., egg laying sites for some turtle species, esp. when sites are limited; specialized feeding areas)	Highest priority should be given to sites with: • specialized/unique habitats which are often found within larger habitats (e.g., forested sites containing permanent springs or seeps; forested sites with a high density of wildlife trees (snags); perched wetlands (i.e., those in depressions on hills); sand/gravel areas near large wetlands; caves; cliffs
	• habitat for sensitive species (e.g., some raptors)	• habitat features especially important to special groups of animals (e.g., forest interior birds)
	• sites with high plant and animal species diversity.	• exceptionally high diversity of native plants and animals, compared to other areas within the planning area
	• sites with high plant community diversity	Ranking of potential sites should consider the following priorities: • large sites • sites with poor representation within the planning area • high quality sites, e.g., high diversity; situated close to large natural areas; high, long term potential to maintain habitat.
	• sites that are near water	

* The Significant Wildlife Habitat Technical Guide provides information on the following specialized habitats: woodlands supporting area or interior-sensitive birds; woodlands with an abundance of cavity trees for nesting, roosting, foraging and use as dens; woodlands with diverse vertical stratification of vegetation; woodlands with abundance of decaying woody debris, leaf litter, mosses; woodlands supporting amphibian breeding ponds; foraging areas producing fruit, hard mast; osprey and bald eagle nesting habitat; turtle nesting habitat; moose

aquatic feeding areas; mink and otter feeding/den sites; areas of high diversity old growth or mature forest; seeps/springs; cliffs and talus slopes; and caves.

Attachment A.10

A Recommended Approach for the Evaluation of Species of Concern and their Habitats (Significant Wildlife Habitat)

Specific Habitat	Key Contacts and Factors	Suggested Standards
Habitat of rare or declining species	OMNR • number of known sites for the species • global importance (percentage of a species' global range that occurs in Ontario); • the degree of rarity of the species in Ontario (S1, S2 or S3 based on NHIC ranking) or in the planning area (based on number of occurrences) • size of the population at the site; • size and quality of the habitat (e.g., how well it meets the needs of the target species; is the existing habitat isolated or connected to other patches; is it free of non-native species that may threaten the target species?, etc.) • ability of the existing habitat to support the target species in the long term;	In the ranking of the habitat of species that are rare or declining, highest priority would be given to: • the significant portions of the habitat of species that are most rare in the province or planning area (i.e., S1 and S2) • the best sites for less rare (i.e., S3) species • significant portions of the habitat for species that are rare globally or nationally. When there are a number of potential sites for protection, highest priority would be given to: • high quality habitats that best meets the needs of the target species • sites with large existing populations • sites with few non-native species • sites with large patches of suitable habitat • sites used historically by the species • sites that are part of, or close to large natural areas (i.e., not isolated) • sites where the species is not hybridized (most applicable to plants) In addition highest priority would be given to: • sites with suitable habitat for several rare and/or declining species • sites that are potentially or actively threatened with destruction • areas where few sites are considered to be securely protected • sites within the planning area where the habitat for a rare or declining species is poorly represented
Habitat of Species with a Large Percentage of their Global Range in Ontario	OMNR • number of sites within the planning area with high quality habitat for target species • size of the habitat • amount of habitat protected in other features and areas located within the planning area, county or region • quality of the habitat	For the habitats of species with a high percentage of their global range in Ontario, highest priority would be given to: • habitats not well represented in the planning area • habitat patches large enough to ensure the sustainability of the species • When there are a number of habitat patches available for a particular species, priority would be given to: • large sites • sites with high diversity, especially sites with rare/other species with a high percentage of their global range in Ontario • high quality sites (e.g., site provides habitat for many other species and is connected to other similar habitats) • sites close to, or preferably connected to, other protected areas • sites in the planning area with poor representation

Attachment A.11

A Recommended Approach for the Evaluation of Wildlife Movement Corridors (Significant Wildlife Habitat)

Key Contact and Factors	Suggested Standards
OMNR • importance of the corridor to the survival of the species using it (e.g., only corridor to a large deer yard) • significance of the wildlife habitat or natural areas to be connected by the corridor • corridor habitat type (i.e., determines the number and type of species that will use it) • main cover type and condition of corridor • width of the corridor • number and length of gaps in the corridor	For evaluating the significance of wildlife movement corridors, highest priority is usually given to: • corridors that connect seasonal concentration areas to other critical parts of their habitat (e.g., connecting deer winter habitat to spring and summer range) • corridors linking the most significant natural heritage features and areas within the planning area • sites where only one wildlife movement corridor presently exists to connect significant wildlife habitats Where there is a choice of wildlife movement corridors, it is recommended that those with the following characteristics be selected: • greatest amount of natural cover; greatest amount of habitat structure (e.g., layers of vegetation) and ground cover • greatest width, preferably with a buffer • greatest number of species using them • greatest number of rare species using them • greatest amount of unbroken length (gaps no more than 20 m long) • length (shorter corridors often preferable to longer ones) • greatest number of natural areas and/or significant wildlife habitats to be connected • greatest abundance of food plants (e.g., berry or nut producers) • the best habitat for the target species • closest to or containing a permanent water source • the best opportunity for protection (e.g., sometimes unopened road allowances, railway rights-of-way and unopened shoreline road allowances can be protected easily as animal movement corridors)

Attachment A.12

Recommended Information Sources for Significant Wildlife Habitat

	Sources of Information and Information Provided
	A) Seasonal Concentrations of Animals
Waterfowl staging, nesting and migration stopover areas	• Contact OMNR district and areas offices, and the Canadian Wildlife Service (CWS) for locations of regionally and locally significant sites. CWS: information on species habitat requirements and species of conservation concern. Ducks Unlimited Canada: locations of important local sites, species habitat requirements, and restoration of waterfowl nesting habitat.
Other Bird Species	• Ontario Heronry Inventory. Bird nesting surveys provide valuable information on nesting locations and numbers of birds using the site. This information can be used to determine the locations and sizes of bird nesting colonies. Contact Long Point Bird Observatory/Bird Studies Canada. Related OMNR publications: McLaren (1996) and Bowman and Siderius (1984). • Ontario Lakes Loon Survey, now called Canadian Lakes Loon Survey (CLLS)) – coordinated by the Long Point Bird Observatory/Bird Studies Canada, provides information on nesting pairs as well as pre-migratory concentrations. Contact CLLS, Bird Studies Canada. • Atlas of colonial waterbirds nesting on the Canadian Great Lakes, 1989-91. Canadian Wildlife Service, Ottawa. CWS (Hull, Quebec): Annual Breeding Bird Survey (variety of habitats). Contact: CWS (Hull, Quebec) • Ontario Breeding Bird Atlas (Cadman et al., 1987) provides information on breeding birds derived from 10 km by 10 km sampling squares in the south and 100 km by 100 km squares in the north. • The Important Bird Areas Program has recently been established in Ontario. The program will identify significant sites at the global, continental and nation level. Contact Audrey Heagy, Bird Studies Canada/Canadian Naturalists Federation. • Ontario Rare Breeding Bird Program (ORBBP) and Ontario Birds at Risk (OBAR) programs are targeted on specific species and the data are recorded by UTM grid, which can be accurate to within 100 metres. Contact the Canadian Wildlife Service in Guelph, and the Long Point Bird Observatory/Bird Studies Canada. • Ontario Nest Records Scheme (Peck and James, 1983,1987). Contact Centre for Biodiversity, Royal Ontario Museum, Toronto. • Audubon Field Notes, formerly called American Birds, provides information on birds. Information is forwarded to the Ontario Regional Editor (Ron Ridout). • Forest Bird Monitoring Program. Contact: CWS, Guelph. • Christmas Bird Counts and the American Birds and Birder's Journal provide annual updates on Christmas bird counts. Christmas Bird Counts may provide information on migration stopover sites and winter concentration areas. The National Audubon Society coordinates this program. Christmas Bird Count coordinators can be obtained from the Audubon Field Notes. • North American and regional population trends (Robbins et al, 1986).

	Sources of Information and Information Provided
	• Western Hemisphere Shorebird Reserve Network (CWS, Ottawa) has identified some sub-nationally significant sites in Ontario. CWS, Bird Studies Canada and the Federation of Ontario Naturalists (FON): location of provincially and regionally significant sites of shorebird and landbird migration stopover areas. • Ontario Shorebird Survey is a volunteer program which provides information on migrating shorebirds. Contact: CWS. • Many local or regional projects have been undertaken, e.g., Toronto Region Bird Report (Parker et al., 1985) and Annual Bird Report Durham Region (Bain and Henshaw, 1992). These reports provide important information, particularly for species uncommon to an area. They also list contacts. Contact local naturalist groups and local OMNR offices. • MNR district and area offices can be contacted for information on wild turkeys including winter distribution and population status. Dickson (1992) is a source of information on wild turkey biology and management (not specific to Ontario). • Consultant reports often contain plant and animal inventories for clients for potential projects and are provided to planning authorities, conservation authorities, OMNR, MTO, or Ontario Hydro. • Marsh Monitoring Program, coordinated by Long Point Bird Observatory, is a useful source for breeding marsh birds and calling amphibians. • Other potential information sources: conservation authorities and naturalist clubs.
Mammals	• OMNR district and area offices can be contacted for information, as well as Conservation Authorities. • The Atlas of Mammals of Ontario (Dobbyn, 1994) provides the most recent discussion of the distribution of mammal species in Ontario. • Winter deer yards: OMNR district/area offices; OMNR publications include Buss et al (1994) describes an aerial survey procedure for delineating deer yards. Broadfoot and Voigt (1996 a, b) suggest how and when to measure deer yard size. • OMNR district and area offices should be contacted for information on moose and bear concentrations. OMNR conducts aerial inventories for moose and often has information on important black bear habitats. Local contacts, such as trappers, hunters and naturalists, can be obtained from OMNR district and areas offices. • Few bat hibernacula and maternity colonies have been identified or mapped to date, however authorities on bats generally have knowledge of habitat preferences. Contact OMNR for possible locations of hibernacula & names of bat experts. The Ontario Ministry of Northern Development and Mines can provide information on the location of abandoned mines that may provide significant bat hibernacula. Other sources may include University Biology Departments, consultant and naturalist club reports, and geological maps (locations of limestone cliffs and outcrops) .
Reptiles and Amphibians	• Ontario Herpetofaunal Survey (OHS), Oldham (1996), provides a starting point for identifying sites with high diversity of amphibians and reptiles. The OHS data are collected by volunteers and are often based on single site visits. Survey effort is variable. Contact Natural Heritage Information Centre, OMNR, Peterborough.

	Sources of Information and Information Provided
	• Backyard Amphibian Survey, and Amphibian Road Call Counts, coordinated by the Canadian Wildlife Service. Former encourages volunteers to record all calling frog and toad species heard in their backyard or local wetland. In the latter program, species and relative abundance are recorded at sites along a predetermined route. Both volunteer programs are intended to monitor long-term population trends. • Marsh Monitoring Program, coordinated by the Long Point Bird Observatory provides records on calling amphibians in selected marshes. It is designed to record presence and relative abundance, and is currently focused on Great Lakes "areas of concern". • Local OMNR offices may have information on amphibians and reptiles, e.g., in wetland evaluation records. OMNR can also provide a list of local contacts for amphibian and reptile sightings. • Some consultant reports include inventories of reptiles and amphibians and may be obtained from the planning authority, MNR, Ministry of Transportation, Ontario Hydro, etc. • Canadian Museum of Nature; Royal Ontario Museum. Data from these agencies has been incorporated into the OHS. • Other potential information sources: Contact Conservation Authorities and naturalist clubs.
Butterflies	• Ontario Butterfly Atlas (Holmes et al., 1991) provides general information on distribution, habitat and food requirements, but no site-specific information. • Toronto Entomologists Association (contact Royal Ontario Museum). • Local OMNR district and area offices; OMNR, Agriculture Canada (Ottawa), and University Biology Departments: possible sources of information on local experts, and locations of locally and regionally significant sites. • Other possible information sources: Conservation Authorities; consultant and naturalist club reports.
	B) Rare Vegetation Communities or Specialized Wildlife Habitats
Wetland	• OMNR Wetland evaluations. Some of the wetlands that do not meet the definition of provincially significant may contain rare or specialized habitats that are important at the local level. Wetland evaluation records contain information that would be useful in making this determination. • NW Ontario Wetland Classification (Racey et al, 1996), developed as part of the ecological land classification program for NW Ontario, describes procedures for determining wetland types and representation. • Ecological Land Classification (ELC) for Southern Ontario (Lee et. Al, 1998) provides a listing of all the natural plant communities (forest types, wetland types, etc.) found in southern Ontario. • The Natural Heritage Information Centre (NHIC) has estimated the range (in Ontario) and ranked (for rarity) all the wetland, prairie, alvar, savannah, woodland and other communities identified by the Ecological Land Classification for

	Sources of Information and Information Provided
	Southern Ontario (Bakowsky, 1996; Lee et. al, 1998). Contact NHIC
Prairies, alvars and savannahs	• Studies on rare communities in Ontario include descriptions and general locations of rare communities. See Bakowsky (1993), Catling et al (1992), Catling and Catling (1993) and Catling and Brownell (1995). • The Natural Heritage Information Centre has estimated the range (in Ontario) and ranked (for rarity) all the wetland, prairie, alvar, savannah, woodland and other communities identified by the Ecological Land Classification for Southern Ontario (Lee et. al, 1998). This list is available by contacting the Natural Heritage Information Centre.
Woodlands	• Forest Ecosystem Classifications (FECs) are complete for NW Ontario (Sims et al., 1989), NE Ontario (McCarthy et.al., 1994), Central Ontario (Chambers, 1997). The FECs in northern and central Ontario are based on detailed analyses of plot data, including soils, vegetation and site information. Planning authorities can use the classifications for a detailed description of the natural forest types. The classifications provide some information on the distribution of species. Classifications also help to determine if a particular forest stand represents a true forest type. • The Ecological Land Classification for Southern Ontario (Lee et. al., 1998). This classification is based on a synthesis of existing data and literature reviews. It includes keys and fact sheets for forest communities (ecosites). The fact sheets provide information on distribution and abundance of forest types. The classification lists the forest types that exist in each ecological site region. Planning authorities can use this list to determine if they have good representation of all forest types. • Forest Resource Inventory (FRI) data, available from OMNR can be used to prepare a preliminary list of rare forest types in a planning area. FRI maps are usually mapped at 1:15,840. They provide a list of the main tree species in each stand, percent composition of the stand and the stand age. Some FRI data have been digitized (for many planning authorities). Hard copies are available for all of Ontario. The digital data can enable rapid identification of stands that appear to be rare or unusual. • Ontario Tree Atlas. Coordinated by the University of Guelph • The Natural Heritage Information Centre has estimated the range (in Ontario) and ranked (for rarity) all the wetland, prairie, alvar, savannah, woodland and other communities identified by the Ecological Land Classification for Southern Ontario (Bakowsky, 1996; Lee et. al., 1998). This list is available by contacting the Natural Heritage Information Centre.
	C) Habitats of Species of Conservation Concern
Birds	OMNR ecologists; NHIC office in Peterborough • lists of some species of conservation concern and mapped locations of some of them

	Sources of Information and Information Provided
	• Canadian Breeding Bird Survey (Downes and Collins, 1996) presents bird population trends derived from annual surveys from 1966-1994; identified significant declines in some species; purpose of the program is to detect and measure year-to-year and long-term changes in breeding bird populations. Also found at CWS (Hull, Quebec) and Bird Studies Canada) • Setting conservation priorities for the birds of Ontario (Wallace, 1995) a review of existing systems for setting conservation priorities; presents a suggested approach and list of species of conservation concern (also found at CWS, Bird Studies Canada) • Ontario Birds at Risk (Austen et al. 1994) summarized data from the Ontario Breeding Birds Atlas and Ontario Rare Breeding Bird Program to describe status, habitat requirements, and conservation needs of 58 bird species considered to be at risk (also found at Bird Studies Canada) • Atlas of the Breeding Birds of Ontario (Cadman et al., 1987) summary of results from atlas work by volunteers regarding breeding bird species abundance and richness observed in 10 by 10 km squares; good habitat descriptions for breeding birds of Ontario; regional coordinators and local volunteers who conducted surveys are perhaps best source of site-specific information (book now out of print; may also be available at University biology dept. libraries; database at NHIC in Peterborough) • COSEWIC lists of vulnerable, threatened, endangered species in Canada • COSSARO lists of vulnerable, threatened, endangered species in Ontario • COSEWIC status/recovery reports- present situation, habitat requirements, recovery plan outlines for specific species (also found at CWS, Bird Studies Canada) Other potential information sources: Conservation Authorities; Toronto Region Bird Report (Parker et al., 1985), which may be found at the Toronto Ornithological Club; species-specific studies funded by OMNR, WWF; Annual Bird Report, Durham Region (Bain and Henshaw, 1992); consultant, naturalist club, and university studies. Latter studies may provide additional information for specific areas (may be found at OMNR; Ministry of Transportation; Ontario Hydro; planning authority offices; NHIC).
Plants	OMNR ecologists; NHIC in Peterborough • lists of some species of conservation concern and mapped locations of some of them • list of nationally rare plants (Argus and Pryer, 1990) (also found at the Canadian Museum of Nature, Ottawa) • Provincially rare list of plants. This list is regularly updated. • Atlas of rare vascular plants of Ontario (Argus et al., 1982-87) provides notes on status, habitat, small-scale maps of known locations, and pertinent

	Sources of Information and Information Provided
	references for many rare plants. Includes herbaria that were consulted and names and addresses of contributors- people who may be able to provide more site-specific information. (also found at National Museum of Natural Sciences, Ottawa) • Vascular Plants of Eastern Ontario (Cuddy, 1991) lists the status of plant species that grow in Eastern Ontario as provincially rare, rare, uncommon, and common. • Distribution and status of the vascular plants of Central Region (Riley, 1989) lists the status of plant species that grow in south Central Ontario as provincially rare, rare, uncommon, and common. • Distribution and status of the vascular plants of Southwestern Ontario (Oldham, 1993) lists the status of plant species that grow in Southwestern Ontario as provincially rare, rare, uncommon, and common. • County/regional planning authority vascular plant floras for the Carolinian zone of Canada. (Varga and Allen, 1990). Summarizes vascular flora in 16 counties and regional planning authorities in Carolinian zone of southern Ontario; notes rare species, general locations of them; names and locations of top botanical sites in each areas; names, addresses of contributors. • Ontario Tree Atlas. Coordinated by the University of Guelph. • COSEWIC status reports on vulnerable species (also found at CWS) Other potential information sources: Conservation Authorities; Field Botanists of Ontario newsletter (may indicate locations of some species and diverse vegetation communities - NHIC, Peterborough); some OMNR, consultant, naturalist club, and university studies may be found at OMNR; Ministry of Transportation; Ontario Hydro; planning authority offices; NHIC, Peterborough.
Reptiles and amphibians	OMNR ecologists; NHIC office in Peterborough • list of provincially rare species is regularly updated • results of Ontario Herpetofaunal Summary (Oldham and Sutherland, 1986) provides locations of different species of reptiles and amphibians; NHIC maintains the database • COSEWIC status reports on vulnerable species (also found at CWS) Canadian Wildlife Service (Burlington, Ontario), regarding the Backyard Amphibian Survey, and/or Amphibian Road Call Counts. Volunteers can provide information on locally important habitats for these species. Long Point Bird Observatory, regarding the Marsh Monitoring Program Other potential information sources: Conservation Authorities; consultant, naturalist

	Sources of Information and Information Provided
	club, and university studies (may be found at OMNR; Ministry of Transportation; Ontario Hydro; planning authority offices; NHIC, Peterborough).
Mammals	OMNR ecologists; NHIC office in Peterborough • list of provincially rare species is regularly updated • COSEWIC status reports on vulnerable species (also found at CWS) Other potential information sources: Conservation Authorities; consultant, naturalist club, university studies (may be found at OMNR; Ministry of Transportation; Ontario Hydro; planning authority offices; NHIC, Peterborough); Peterson (1966). The Mammals of Eastern Canada (may be found at University libraries; OMNR offices)
Butterflies	OMNR ecologists; NHIC office in Peterborough • list of provincially rare species is regularly updated • reports on the status of most threatened butterflies in the Carolinian zone of southern Ontario, includes general location of records; notes on distribution, habitat preferences; mentions public and private collections; recommendations for conservation. Found at the NHIC office: some OMNR offices and University libraries. Other potential information sources: Conservation Authorities; Agriculture Canada (Ottawa) may provide contact with butterfly experts; Toronto Entomological Association newsletter and the Ontario Butterfly Atlas (Holmes et al., 1991) (NHIC).
Other groups	NHIC in Peterborough • maintains a database on rare dragonflies, moths, tiger beetles, and unionid mussels • can provide contact with specialists.

APPENDIX B

KEY CONCEPTS IN NATURAL HERITAGE SYSTEM PLANNING

KEY CONCEPTS IN NATURAL HERITAGE SYSTEM PLANNING

Important steps in natural heritage system planning are to identify the natural areas within the planning area and to assess their ecological importance. Each candidate site can be evaluated using several factors since natural heritage features and areas provide many values. However, it is often necessary to rely on a limited number of factors due to constraints such as budget, time or information.

The following is a discussion of some ecological concepts that are commonly incorporated into various natural heritage area evaluation procedures. These concepts are based largely upon Crins (1996), Decker et al. (1991), Noss and Cooperrider (1994), Phillips (1996), Primack (1993), Riley and Mohr (1994), Shafer (1990) and Smith and Theberge (1986). Figure 1 illustrates some of these concepts.

- **Representation / Distribution**

A fundamental step in natural heritage system planning is to consider the protection of the full range of natural features that occur in an area, including both rare and common features, thus contributing to the preservation of biodiversity at the species and community levels. Further, species, communities and ecosystems that are well distributed across their native range are less susceptible to decline than species, communities and ecosystems confined to small portions of their historic range (see Figure 1A).

Representation is normally assessed at the site district level. It forms the cornerstone of the identification and evaluation procedure for the province's ANSI program. Planning authorities can make a significant contribution to the protection of the full range of natural features and species that occur in an area by ensuring the protection of any significant ANSIs that have been identified. Representative areas provide a logical foundation around which a planning area's natural heritage system can be designed.

- **Size**

Large patches of natural areas are generally more valuable than smaller patches (see Figure 1B). Similarly, a single large patch is generally better than several smaller patches of the same total area (see Figure 1C). There are several reasons.

1. Larger patches tend to contribute more to biodiversity than smaller patches of similar habitat (Phillips, 1994). This is because large areas tend to contain a broader diversity of features and habitats than smaller areas. In doing so, larger areas generally:

    - contribute more to the diversity of features in an ecoregion/ecodistrict than smaller areas, and

    - meet more of the habitat requirements of a greater number of species than smaller areas. One of the reasons for this is that large areas generally provide more "interior" (i.e., contiguous, relatively undisturbed, unfragmented) habitat than smaller areas. "Interior" habitat is critical to the survival of many species, particularly "forest-interior" birds.

Figure 1: Relative Habitat Value in Relation to Patch Size, Shape, Arrangement and Function

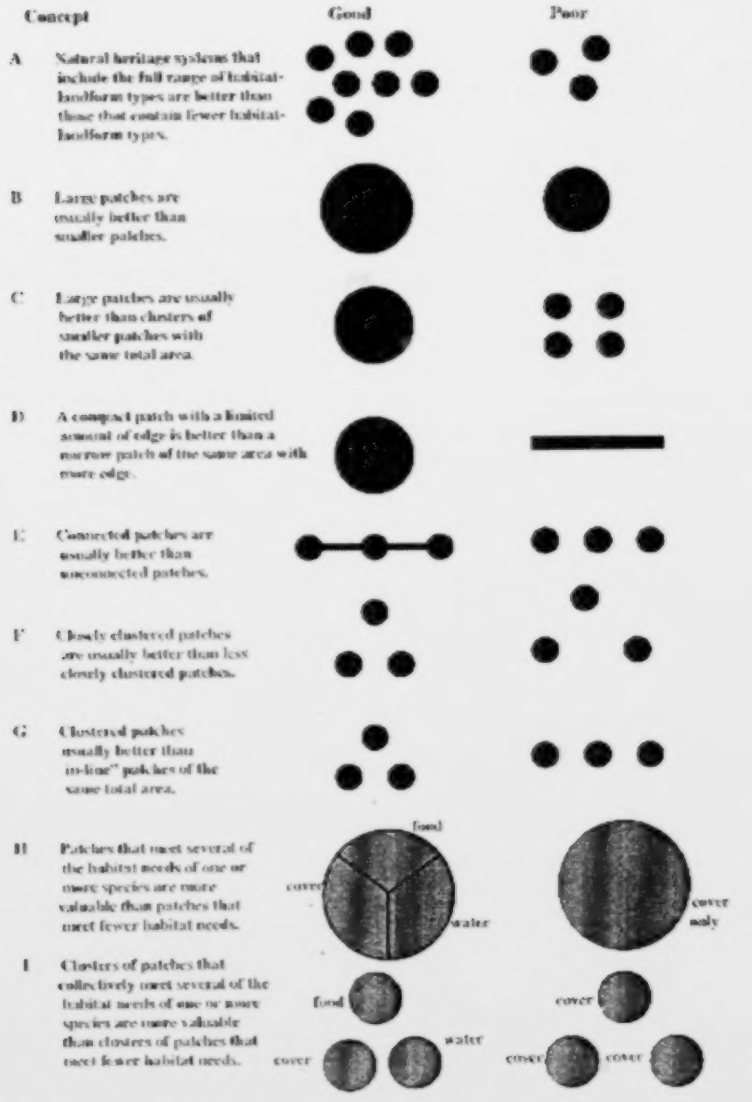
Concept
Good
Poor
A Natural heritage systems that include the full range of habitat-landform types are better than those that contain fewer habitat-landform types.
B Large patches are usually better than smaller patches.
C Large patches are usually better than clusters of smaller patches with the same total area.
D A compact patch with a limited amount of edge is better than a narrow patch of the same area with more edge.
E Connected patches are usually better than unconnected patches.
F Closely clustered patches are usually better than less closely clustered patches.
G Clustered patches usually better than "in-line" patches of the same total area.
H Patches that meet several of the habitat needs of one or more species are more valuable than patches that meet fewer habitat needs.
I Clusters of patches that collectively meet several of the habitat needs of one or more species are more valuable than clusters of patches that meet fewer habitat needs.
food
cover
water
cover only
food
cover
water
cover
cover
cover

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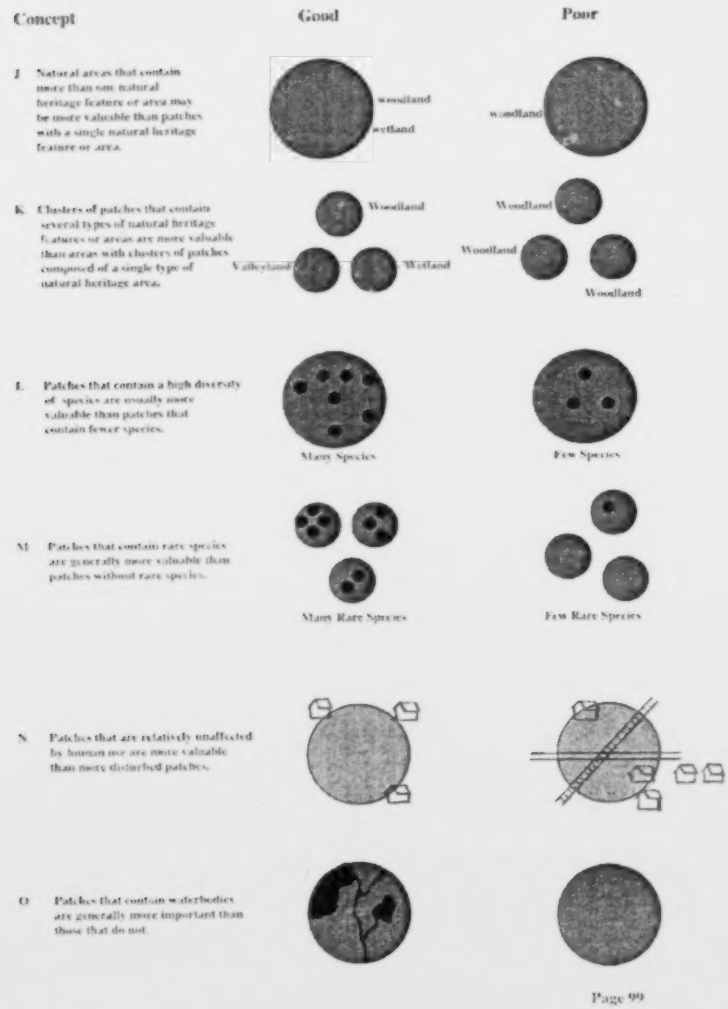
Figure 1: Relative Habitat Value in Relation to Patch Size, Shape, Arrangement and Function


Concept
Good
Poor
J Natural areas that contain more than one natural heritage feature or area may be more valuable than patches with a single natural heritage feature or area.
woodland
wetland
woodland
K Clusters of patches that contain several types of natural heritage features or areas are more valuable than areas with clusters of patches composed of a single type of natural heritage area.
Woodland
Valleyland
Wetland
Woodland
Woodland
Woodland
L Patches that contain a high diversity of species are usually more valuable than patches that contain fewer species.
Many Species
Few Species
M Patches that contain rare species are generally more valuable than patches without rare species.
Many Rare Species
Few Rare Species
N Patches that are relatively unaffected by human use are more valuable than more disturbed patches.
O Patches that contain waterbodies are generally more important than those that do not.

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Larger natural areas are generally more resilient to the impacts of human disturbance. For example, many of the smaller woodlots in southern Ontario contain a large number of invasive exotic plant species that can or have displaced native species. Larger natural areas are more likely to have internal ecosystem functions like nutrient cycles and food webs intact and to be large enough to permit different successional stages to co-exist on the site.

1. Large areas are capable of supporting larger populations of different species than smaller blocks of similar habitat (Noss and Cooperrider, 1994). Large populations tend to be more resilient to human-induced and other disturbances than smaller populations.

2. Cumulatively, small areas can provide significant benefits to the overall landscape by reducing erosion, providing wildlife habitat, etc. These effects, in turn, benefit other critical habitats.

Are small areas worth keeping? Many small natural areas are worthy of protection. There are several reasons why such areas can be important.

1. Small areas, particularly if they provide unique habitat conditions, can support rare plant or animal species found nowhere else in the area. Such small areas are particularly important to species with low mobility (Riley and Mohr, 1994).

2. Small areas, particularly if interspersed amongst larger habitat patches, can provide important temporary refuges better enabling more mobile species to move between larger patches.

3. As well, in highly diverse landscapes, the protection of several smaller habitat patches can provide better representation of a wider range of habitats than a single larger habitat patch (Peterson and Peterson 1991, cited in Riley and Mohr 1994).

- **Shape**

The shape of natural heritage areas affects their value as wildlife habitat and their resilience to disturbance effects. Round or block-shaped patches contain less "edge" per unit of area than long, narrow patches (see Figure 1D). Edge refers to the area where different habitats (or habitat conditions) meet. For example, edges occur where woodlots meet open fields, where uplands meet lowlands, along shorelines and fencerows, at the interface between deep water and shallow water, etc. Many species of wildlife (e.g., deer, grouse) need "edge" habitats.

Other species, however, require large contiguous blocks of habitat well away from habitat edges. These areas are often termed interior habitats. Some interior habitat dwelling species will only use an area if it is 100 metres or more away from an edge.

In parts of Ontario, particularly in the south, the fragmentation of natural habitats has created an abundance of edge habitat while, at the same time, reducing the availability of interior habitats. Consequently, in southern Ontario, round or block-shaped areas would normally be higher priority areas for protection than long, narrow habitats of similar composition. In some situations, however, narrow habitat patches may have special value in ensuring the connection of other important patches.

- **Fragmentation / Connectedness**

An obvious impact of development on natural areas is fragmentation. Fragmentation refers to the process by which large, interconnected natural areas are converted to a series of smaller, often isolated natural areas. In much of southern Ontario, the landscape has become highly fragmented. In other parts of the province, particularly some northern areas, fragmentation has been less severe.

As indicated above, smaller natural areas generally meet the needs of fewer species of wildlife than larger areas. The remaining areas may simply be too small to meet the habitat needs of the species that once used the area, and smaller areas, on average, will contain a lower diversity of habitat conditions than larger areas. Small areas are also more easily damaged by disturbance effects and are less likely to have their functional processes intact.

Another potentially serious consequence of habitat fragmentation is the physical separation, or isolation, of one habitat patch from another. If separation distances are large enough, the movement of plants (i.e., their seeds) and animals from one patch to another can be hindered or prevented. The resultant isolation of one wildlife population from another can:

- lead to inbreeding which, over time, may reduce the ability of the population to survive; and
- prevent the recolonization of an area after local extinctions.

As a general rule, then, interconnected patches of habitat are better than isolated patches (Figure 1E). However, there are exceptions. Some of the habitats and species found in some isolated areas are better protected when they are isolated from other areas. Other habitats (and species) do benefit from connections, but only if the connections between them have the appropriate characteristics. For example, very narrow connections, such as fencerows which link one woodlot to another, can provide predators with an extremely effective hunting environment, which can put prey species at risk. The key is to plan for connections of larger woodlots or a network of smaller areas. In doing so, the widest possible connections can be protected. Where connections are very narrow, planning authorities may consider improving (i.e., widening) them.

- **Arrangement / Proximity**

Blocks of habitat that are arranged close together are usually better than blocks of habitat that are located further apart. There are two reasons for this. First, wildlife are able to move more safely between closely spaced habitat patches than between patches located farther apart. Secondly, closely spaced patches are more likely to have important functional (i.e., hydrological or biochemical) linkages than more distant patches (Figures 1F and 1G).

- **Habitat Diversity / Complexity**

Natural areas (or clusters of areas) that span a range of topographic, soil and moisture conditions tend to contain a wider variety of plant species and plant communities, and may also support a greater diversity of ecological processes, than similar areas that occupy a narrower range of topographic, soil and moisture conditions. Areas with a high diversity of plant species and plant communities will generally support a correspondingly high diversity of animal species and communities. For example, a natural area that includes both wetland (lowland) and upland components will provide a greater range of habitat conditions for wildlife than either habitat type alone. Similarly, a wetland that contains each of the four wetland types (marsh, swamp, bog and fen) will provide more habitat diversity than a wetland composed entirely of marsh (see Figures 1H, 1I, 1J and 1K). A variety of techniques is available for assessing habitat and/or vegetation community diversity.

- **Species Diversity**

Areas that contain a high diversity of plant and animal species are generally more important than areas that contain a lower diversity of species (Figure 1L). In some situations, however, areas that contain a relatively low diversity of plant and/or animal species are important. For example, these areas are important where they provide habitat for an endangered or threatened species, or some other species of particular interest.

Species richness assessments can be undertaken as a means of comparing species diversity between sites. Species lists compiled in individual site inventory reports by OMNR, conservation authorities and others may be useful in conducting such assessments. It is suggested that diversity be assessed relative to each candidate area's size since the number of species will vary with size.

- **Species Rarity**

In general, habitats that contain rare species are more valuable than habitats that do not contain such species (Figure 1M). Rarity is a relative term and can be described in 5 different ways: (1) species that are scarce, but occur over a wide geographical area; (2) species that only inhabit one place; (3) species that are geographically separated from their main range; (4) species that are at the edge of their geographical range; and (5) declining species that were once more abundant and/or widespread but are now depleted.

Assessments of rarity are often expressed as the number of rare species or features in an area. Lists of species and features considered rare at one or several scales (e.g., local, regional, or national), such as those provided in Riley (1989), Cuddy (1991) and Oldman (1993), or in NHIC's status lists, are useful in evaluating candidate natural areas for significance. Specifically, the occurrence of rare species may add to the significance of a particular feature or area.

- **Naturalness and Disturbance**

Relatively undisturbed natural areas are generally more desirable than highly altered areas (Figure 1N). The most common rationale for using naturalness as a criterion is that undisturbed, natural areas provide the best source of baseline information to compare with other modified areas. By studying how undisturbed ecosystems function, a better understanding of how human impacts modify ecosystems can be gained. These areas will also provide important clues for restoring ecosystems that have been modified.

Methods used to evaluate naturalness vary depending on the ecosystem, information available and the level of human disturbance. For example, the naturalness of a valleyland may be assessed by measuring the relative absence of exotic species, cattle-grazing or man-made structures such as rip rap, dams, roads or buildings.

- **Hydrologic and Related Values**

In many areas, water bodies, including wetlands, often represent a relatively small percentage of the total land area, yet they can be disproportionately more valuable than other areas (Figure 1O) for several reasons:

  - there is a large number of aquatic or riparian (moist-area dependent) plant and animal species that depend upon water bodies or wetlands to fulfill their habitat needs;
  - there is a large number of other animal species that require access to water bodies for all or part of their life cycle in order to survive;
  - there is a large number of species that use water bodies, especially streams, as travel or migration corridors;
  - they are critical to the maintenance of nutrient and other bio-chemical nutrient cycling processes upon which all species depend; and
  - they are integral to the hydrologic functioning of the watershed within which they are located.

It is suggested that measures be taken to protect water bodies, wetlands, and other areas of significant hydrological importance (i.e., headwaters, recharge areas, discharge areas, etc.).

APPENDIX C

ADDRESSING IMPACTS OF DEVELOPMENT ON NATURAL HERITAGE FEATURES

ATTACHMENT C.1

DESCRIBING THE ENVIRONMENT

In cases where a planning authority has concluded that an assessment is required to determine the potential impacts associated with a development proposal, existing environmental conditions are usually examined. This attachment provides an overview of information sources and possible techniques for describing the existing environment

This attachment addresses: terrain setting; hydrology; fluvial geomorphology; and biological resources.

A. Terrain Setting

(i) Describe Terrain Setting Using Existing Information

Plant and wildlife associations are largely dictated by the terrain or physical environment. The source of water (ground and/or surface), timing and locations of its delivery, and nature of the topography and soils all contribute to this understanding of terrain. This understanding translates into an appreciation for how a natural heritage area works. Understanding how it works enables an accurate assessment of potential development effects.

An examination of the terrain can involve:

a) a characterization of the surface and subsurface soils (e.g., clay, gravel, sand, silt, peat);
b) identification of local landform types (e.g., morainal, glaciofluvial, glaciolacustrine, alluvial, etc.); and
c) identification of landform position (location of the natural heritage area in the landscape and within its watershed).

Existing information such as Ontario Geological Survey Mapping, hydrogeological maps and reports, water well records, topographic and Ontario Base Maps (OBMs), soils maps, floodplain mapping, fish habitat maps, airphotos, Forest Resource Inventory (FRI) maps, earth science ANSI reports and wetland evaluation data records can be used to describe the terrain setting.

(ii) Field Techniques for Refining Information on Terrain Setting

The terrain setting will have been generally described using existing data. Some additional tasks may be appropriate for precise definition of functions. This work is most critical where it appears that surface and groundwater pathways are related and could be affected by the proposal. Additional work could include site-specific measurements such as installation of boreholes and groundwater monitoring. Installation of boreholes is appropriate in more complex geological settings where little is known about groundwater movements or relationships between surface and groundwater.

B. Hydrology

(i) Describing Hydrology Using Existing Information

Surface water patterns are determined from topographical and OBM maps. For wetlands, fish habitat and some wildlife habitats, an understanding of the hydrological regime is important. This regime can be understood by determining:

a) the extent (area) of a feature and its boundaries;
b) the hydrological catchment boundary or drainage basin for the site;
c) overland flow contribution points and outlets; and
d) hydrological processes.

- **Catchment Boundary and Drainage Pattern Identification**

Catchment boundaries can be derived from topographic mapping supplemented with airphoto interpretation. Drainage reports and municipal service drawings may help define catchment areas. Catchment boundaries may need to be confirmed in the field.

Drainage patterns can be identified using background information and confirmed in the field. Distinction can be made between permanently and intermittently flowing watercourses. Fish habitat maps prepared by OMNR or other sources and available from planning authorities may depict intermittent as well as permanent streams and may indicate whether they are coldwater or warmwater habitat. Conservation authorities may also have watershed, subwatershed or drainage area mapping which may be of assistance.

(ii) Field Techniques for Obtaining Additional Hydrological Information

- **Water Quantity**

For some site assessments, it may be necessary to obtain long-term data, so this component of the study may have to be initiated earlier than others. Where water quantity is an issue, water-level gauges can be established. Some areas may have established gauges which could be useful. The purpose of gauges is to determine seasonal water-level fluctuations. The number of gauges required depends on the number of tributaries involved and the location and nature of the proposed development. Gauges may serve as post-development monitoring stations.

Frequency and duration of water-level monitoring will depend on the natural heritage features and areas potentially affected by development. Understanding hydrological processes is critical in and adjacent to wetlands and fish habitat, but may not be important in some significant woodlands and wildlife habitat. Observations are usually made at least during spring and summer to understand the hydroperiod which includes the duration, frequency, depth, extent and season of flooding.

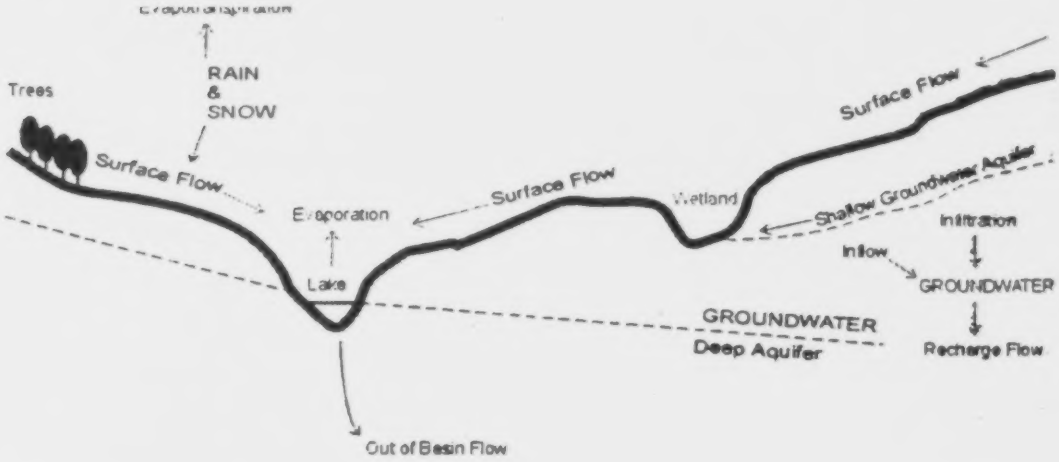
- **Determining Contribution of Water and Water Balance**

Often water flowing into a natural heritage area originates from more than one subcatchment. It may be necessary to determine the relative contribution of each basin to the area. This involves an understanding of soils, land use, and topography.

The following figure depicts elements for consideration in determining a water balance. This step identifies how water is being delivered to an area. A water balance is used to determine changes in

these pathways due to development. Data on precipitation, temperature and sunlight hours are used to determine the annual evaporation loss and annual surplus (runoff plus infiltration). Given the high variability of temperature and precipitation rates in Ontario, the water balance is usually

Water Balance Considerations



calculated monthly. Calculation of a water balance is usually necessary only where it is essential to determine potential impacts on key functions.

- **Water Quality**

Water chemistry data may be available. If not, background conditions may need to be determined by sampling and analyzing for:

a) inorganic parameters (nutrients);
b) total suspended solids;
c) trace metals;
d) chlorides;
e) field measurements of temperature, pH, conductivity, and dissolved oxygen; and
f) organic parameter scan (not required at all stations)
g) bacterial parameters.

Sampling is geared towards understanding inputs and outputs of the natural heritage area thereby helping to determine its role in modifying water quality. Sampling includes a range of seasons with samples being collected during both dry and wet weather conditions. It is considered important to sample wet weather conditions to evaluate effectiveness of the area at improving water quality.

Sampling intensity depends on the amount of existing information and predicted impacts of the proposed development. The potential impacts will also help determine water quality parameters for monitoring.

While water quality sampling is a good method of evaluating water quality conditions, it only monitors conditions at a point in time. Benthic invertebrates are excellent indicators of water quality because they spend their early stages in aquatic habitat. In some instances, aquatic invertebrate populations may be used to determine water quality.

Some wetland systems (e.g., bog, fen) are sensitive to subtle shifts in surface water chemistry. More intensive water quality sampling programs may be necessary for development proposals that may affect these wetland types.

Understanding water quality processes demands a determination of not only chemical concentrations but also chemical loadings. This involves the integration of the quality and quantity information and is best accomplished by conducting a mass balance.

C. Fluvial Geomorphology

The geology of an area dictates the nature of a stream: its gradient, substrate, fertility, and productivity, as well as the form of the valley and its channel. Fluvial geomorphology is the study of these interactions and how they are influenced by land-use changes. The volume of water in a watercourse is the primary factor in shaping its channel. Streams are in dynamic equilibrium, experiencing bankfull conditions that reshape the channel, and low-flow conditions that re-adjust the channel. In natural landscapes, watercourses maintain the shape and form of channel that is most efficient to move and store water and sediments at all flows.

The processes occurring within a watercourse are highly dependent on land use. Changes in land use that affect peak flows and/or baseflows in streams are highly likely to change the configuration of channels and subsequently fish habitat quality.

Rosgen (1996) described a standard method for characterizing the fluvial geomorphology of watercourses. For developments that may affect peak or baseflows in watercourses or the amount of sediment delivery, it may be necessary to complete this analysis.

D. Biological Resources

(i) Introduction

Examples of available information on biological resources include the following (not all of these sources will be relevant to all situations):

a) wetland evaluation data record and mapping;
b) Committee on the Status of the Endangered Wildlife in Canada (COSEWIC) reports;
c) atlases (plants, butterflies, herpetofauna, birds, mammals);
d) FRI maps and woodland polygon mapping;
e) data bases from the Natural Heritage Information Centre (NHIC);
f) Ontario Rare Breeding Bird Program data;
g) ESA and life science ANSI reports;
h) fish and wildlife files at the MNR and conservation authorities;
i) airphoto interpretation;

j) Marsh Monitoring Program (MMP) for birds and amphibians;
k) fish habitat maps at the planning authority; and
l) list of Vulnerable, Threatened, Endangered, Extirpated and Extinct (VTEEE) species from OMNR.

Using existing information, a habitat map may be prepared that shows natural heritage areas and features, vegetation communities, and adjacent lands.

Terrestrial habitats can be characterized by known relationships between wildlife species and habitat requirements. These characteristics can be mapped at a variety of scales ranging from satellite imagery down to very site-specific scales.

(ii) Field Techniques for Describing Biological Resources

Detail required to characterize biological resources will vary considerably depending on the complexity of the site and the nature of the development. This section describes a number of techniques for understanding key functions.

Biological characteristics are described under terrestrial and fish and other aquatic habitats for simplicity. These systems, however, overlap and are dynamic. Some understanding of successional dynamics of the habitat is necessary to interpret biological processes. Biological features are dependent on hydrology and the terrain setting. A change in hydrology is likely to alter vegetation communities and the wildlife species that inhabit an area.

- **Terrestrial Habitat**

Terrestrial habitat may include significant wetlands, habitat of endangered and threatened species, woodlands, valleylands, significant wildlife habitat and ANSIs. Wetlands may include terrestrial, aquatic, and fish habitat. Most adjacent lands will be terrestrial habitats and can include old fields, forests, developed areas, and agricultural lands.

Interfaces among natural habitats occur over a continuum as a result of gradual and often subtle changes in soil texture and moisture, microclimate and topography. Functions of adjacent natural habitats may be closely related and dependent on each other. In addition, terrestrial habitats may change gradually or abruptly into aquatic habitat.

The interface between natural and human-altered habitats is often abrupt and it is usually easy to distinguish where one habitat stops and another begins. This does not mean that these habitats are functionally isolated. For instance, hawks nesting in wetlands, woodlands or valleylands may feed in agricultural lands or old fields; waterfowl that feed and court in wetlands may nest in adjacent old fields.

Terrestrial habitats are usually characterized by mapping vegetation communities and habitat features and inventorying the flora and fauna present. Habitat characterization can be initiated with desktop

materials including aerial photographs, FRI and topographic maps and OBMs. Confirmation of habitat characteristics within the study area may involve some fieldwork.

Characterization of terrestrial habitats leads to a better understanding of relationships within and outside natural heritage areas. It contributes to an understanding of past influences and identifies potential habitat improvements through identification and elimination of limiting factors.

The Ecological Land Classification (ELC) system for southern Ontario and Forest Ecosystem Classification available for much of forested central and northern Ontario provide standardized habitat descriptions. The Ecological Land Classification for Southern Ontario (Lee et al., 1998) also provides procedures for mapping and field data collection. For highly disturbed habitats in the south that are not identified in the ELC, descriptions of the general habitat and dominant species can be provided (e.g., buckthorn thicket). It is best to verify vegetation conditions in the field during the growing season.

Quantitative vegetation sampling methods such as quadrant analysis, transects, point-centered quarter analyses and standard FRI techniques may sometimes be necessary to precisely characterize habitat and to adequately define impacts.

Species-specific habitat mapping is usually prepared for endangered or threatened species. A map depicting habitat use during various parts of the life cycle improves the understanding of potential development impacts.

- **Terrestrial Species Inventory**

The following describes some of the more commonly used techniques of conducting inventories of terrestrial fauna.

Wildlife

Terrestrial wildlife includes invertebrates, amphibians, reptiles, birds and mammals. Wildlife species are indicators of the quantity and quality of habitat present. For example, some species depend upon large forest tracts. Their successful breeding can provide insights into forested habitat quality and quantity. Please refer to the Significant Wildlife Habitat Technical Guide (OMNR, 1998b) for examples of methodologies that can be used to identify and evaluate significant wildlife habitat.

The following describes the types of inventories that may be required to document impacts.

Invertebrates

Ecologically, invertebrates are an important group of wildlife. There are more species and individuals of invertebrates and they have a greater biomass than any other wildlife group. They are the basis of the wildlife food chain and also pollinate a high percentage of plant species. Invertebrates play a major role in decomposition and nutrient recycling.

Despite their importance, little is known about the ecology of most invertebrates and keys for identifying many of them are inadequate. Therefore, a general inventory of invertebrates is not usually suggested for assessing development impacts.

One possible exception is butterflies. These invertebrates are relatively easy to identify and considerable information is available on their ecology and host plant species. However, even butterfly inventories may be excessively time consuming. A relatively complete inventory usually requires multiple visits from early spring to late autumn to cover the flight periods of all potential species. Butterflies also wander considerably, so there may be some difficulty in determining if a species is a resident or a vagrant.

It is suggested that a butterfly atlas be consulted to determine if any significant species have been documented in the general region and if their preferred habitat and plant species occur in the study

area. Work to observe these specific species during the peak of their flight period could then be initiated.

Amphibians

Amphibians include frogs, toads and salamanders. Frogs and toads vocalize during the breeding season and the Canadian Wildlife Service has prepared a standard protocol and a training tape for monitoring these amphibians. In assessing potential development impacts, additional information such as numbers and locations of egg masses and if tadpoles transformed successfully, may be beneficial.

Salamanders are more difficult to inventory. They spend much of their lives in rotten logs, underground or in water. They are best inventoried by looking for egg masses or larval young in woodland pools. Salamanders are important ecologically. In many woodlands, they represent the highest vertebrate biomass and are critical to the food chain.

Reptiles

This group of wildlife includes turtles, snakes and skinks. Turtles prefer warm bodies of water and sunny microclimates for thermoregulation. They are easiest to observe in spring and autumn when sunning behaviour is more frequent.

Snakes are difficult to inventory and are most frequently sighted when sunning in open exposed locations, or by searching under rocks in suitable habitat. In the spring, snakes often remain in the vicinity of their hibernacula for a few days. Usually casual observations of snakes will suffice when assessing potential development impacts. However, when there is concern about a particular species, pieces of wood or metal placed on the ground can be used to attract snakes.

Birds

It is recommended that information on the presence of bird species in a particular study area and their dependence on the area (e.g., breeding, foraging, roosting, migrating) be gathered. Data about birds can be collected by visual and aural techniques such as those used by the Ontario Forest Bird Monitoring Program (FMBP) and the Marsh Bird Monitoring Program (MBMP). All bird species seen or heard in appropriate habitat during their breeding season are usually considered to be probable breeders. Monitoring during migration and winter is usually unnecessary. Exceptions may occur when it is suspected that groups of birds with specific migration habitat requirements (waterfowl, shorebirds) may be present in large numbers.

Mammals

Most mammals are shy and/or nocturnal, with the only evidence of their presence being signs (e.g., scats, tracks). Generally, reliance upon tracks and signs is sufficient. However, in some cases live-trapping or even radio-tagging may be necessary.

Plants

An inventory of plant species on the site is recommended when assessing potential development impacts. Two or three visits are usually made to cover the entire flowering season. Habitat quality can be determined using indices such as percent native species, coefficients of conservatism and the weediness index. These indices are available from A Floristic Quality Assessment System for Southern Ontario (Oldham et al., 1995).

- **Fish Habitat and Other Aquatic Habitats**

Fish habitat may include significant habitat for threatened and endangered aquatic species. Water that does not support fish may also be important in sustaining fish habitat or wildlife such as amphibians.

The OMNR maps available fish habitat information and provides it to planning authorities from time to time. It is recommended that proponents consult this information to determine if habitats are coldwater, warmwater, intermittent or permanent and to determine the habitat type. The OMNR's detailed habitat maps are supplemented by background information including species present and the rationale for habitat type.

ATTACHMENT C.2

Sample Review Form - Assessing Impacts of Development

The following is a list of some of the issues that may be addressed in site-specific assessments of development impacts. Use of this form may streamline the approvals process.

ISSUES TO CONSIDER

1. General Information

- proponent identified
- proponent's representative (consultants) identified
- impact assessment submission date present
- executive summary included

2. Background Information

- surface and subsurface soils
- landform type
- landform position
- natural heritage area boundary
- catchment boundary
- drainage pattern
- vegetation communities
- general habitats
- critical habitats
- significant species
- land use patterns
- resource use
- type/position of the development
- summary of key ecological functions
- potential impacts
- predicted effects

3. Site-Specific Assessments of Impacts

- understanding of hydrogeological setting
- hydrologic information
- water balance exercise
- hydrologic modeling
- water quality information
- habitat assessment details for terrestrial and aquatic systems
- modeling of habitat if required
- confirmation and detailed characterization of significant features
- characterization of linkages (terrestrial and aquatic)
- characterization of values
- characterization of impacts on key ecological functions
- mitigation strategy, net effects predictions and monitoring recommendations
- compatibility with planning area natural heritage systems, or greenland strategies

4. Associated Graphics:

The graphics required will depend upon the type of assessment and the nature of the development . The following are suggested standards for these graphics:

Site-Specific Impact Assessment: Map scale: 1:10,000 or 1:5,000

Can include:
- title
- north arrow
- scale
- legend: date of production/revision, proponent's and representative's identification
- natural heritage area and adjacent lands
- detailed drainage patterns; inflows, outflows
- presence of control structures, culverts, etc.
- water-level gauge locations
- basins and sub-basins
- soil textures
- regional and local groundwater flow patterns (conceptual)
- water quality sampling locations
- detailed terrestrial and aquatic habitat information (i.e., community boundaries)
- spot locations of significant flora and fauna
- locations of critical habitat
- general cover types of adjacent lands
- locations of terrestrial and aquatic linkages
- locations of resource harvest/use
- impact/effect identification:
  - drainage boundary change
  - outfall locations
  - detailed development footprint (e.g., pervious and impervious surface, excavation locations and depths, grading information)
  - habitat removal
  - effects on significant features
  - linkage fragmentation
  - value displacement

- mitigation:
- BMP facility locations
- protective barriers (temporary and permanent)
- rehabilitation/enhancement measures
- plantings
- monitoring

NOTE: In those situations where development proposals are expected to impact a limited number of natural features or ecological functions, more "scoped" site-specific assessment information may be most appropriately mapped at a finer scale, e.g., 1:2,000. Appropriate information at this scale could include:

- title
- north arrow
- scale
- legend: date of production/revisions; proponent's and representative's identification
- adjacent land boundary
- development description/footprint
- impacts/proposed mitigation techniques
- natural heritage area

ATTACHMENT C.3

Examples of Potential Development Impacts and Mitigation

Development Activity	Potential Physical Impacts	Potential Impacts on Functions and Features	Examples of Some Possible Mitigation and Avoidance Techniques
SITE PREPARATION AND SERVICING			
1. Vegetation Removal A) Shoreline/Riparian Areas • clearing • grubbing	• loss of shade may result in increased water temperatures	• water temperatures may exceed tolerance of cold and cool water fish species; changes in fish species composition and abundance	• maintain as much riparian vegetation as possible to maximize shading • plant appropriate species
	• reduced inputs of leaves, twigs, and insects to water bodies	• reduced food supply for aquatic life, including fish	• maintain as much riparian vegetation as possible to provide a food supply
	• reduced bank stability and ability to trap sediment from upland areas; increased erosion, sedimentation and turbidity	• decreased photosynthesis, loss of productivity, loss of fish habitat (e.g., spawning areas), loss of food organisms, avoidance of areas by fish; changes in fish species composition and abundance	• maintain riparian vegetation; develop and implement an erosion and sediment control plan before removing vegetation; stabilize banks where necessary
	• reduced stability of sensitive landforms; increased erosion of landform	• loss of all or part of earth science feature, valleyland, etc.	• avoid vegetation removal on sensitive landforms
	• loss or disturbance of riparian wildlife species	• reduced cover and food supply for species such as otter, mink, beaver and wintering deer; loss of habitat for species requiring both aquatic and terrestrial areas; interruption of riparian corridors	• maintain riparian vegetation and adjacent forests where they exist • rehabilitation / restoration • maintain important wildlife areas (e.g., cover, nesting habitat, movement corridors)
B) Upland Areas • clearing • grubbing	• increased erosion, sedimentation and turbidity and decrease in shade, cover and diversity of vegetation	• decreased photosynthesis, loss of productivity, loss of fish habitat, loss of food organisms, avoidance by fish; changes in fish species composition and	• maintain vegetative buffers; develop and implement an erosion and sediment control plan before removing vegetation

ATTACHMENT C.3

Examples of Potential Development Impacts and Mitigation

Development Activity	Potential Physical Impacts	Potential Impacts on Functions and Features	Examples of Some Possible Mitigation and Avoidance Techniques
		abundance; smothering upland and wetland vegetation	
1. B) Upland Areas • clearing • grubbing	• loss of vegetation and wildlife habitat or loss of significant portions of habitat	• direct habitat loss (e.g., winter cover, nesting trees or important food sources); reduction in habitat below a critical level (e.g., woodland habitat for forest- interior birds) habitat fragmentation	• identify and avoid/protect critical components of wildlife habitat (e.g., winter cover, hibernation sites, migration staging areas, nesting trees)
		• greater exposure of wildlife to predation and parasitism	• design the development to minimize loss of vegetation
		• site may be more vulnerable to invasion by non-native species	• revegetate after development with native species
		• decreased biodiversity	• encourage cluster development to avoid housing adjacent to significant natural features
			• avoid fragmenting forests, and severing linkages; consider restoration and planting projects
	• loss of linkages and corridors for animal movement	• isolation of species, loss of genetic and biodiversity	• leave a buffer around habitats of significant species, identify important animal movement corridors, avoid eliminating corridors
	• disturbance of wildlife species	• noise due to clearing activities may disturb concentrations of wildlife (deer yards, colonially-nesting birds) or those sensitive to human disturbance	• time activities to avoid wildlife disturbance, leave a buffer area around sensitive species
	• loss of rare plant species and communities	• loss of species and biodiversity	• avoid disturbing habitats of rare plant species and communities and establish appropriate buffers

ATTACHMENT C.3

Examples of Potential Development Impacts and Mitigation

Development Activity	Potential Physical Impacts	Potential Impacts on Functions and Features	Examples of Some Possible Mitigation and Avoidance Techniques
	• reduced stability of landforms composed of unconsolidated material (esker, moraine, dune, etc.)	• reduced integrity of landform and loss of significance or loss of earth science ANSI	• minimize vegetation removal on slopes; no roads or skidder tracks; no aggregate pits
2. Grading	• increased erosion, sedimentation and turbidity; increased inputs of nutrients and contaminants to water bodies and wetlands	• decreased photosynthesis, loss of productivity, loss of fish habitat, loss of food organisms, avoidance by fish, lethal or sublethal toxic effects on aquatic life; changes in fish species composition and abundance; changes in wetland plant communities	• maintain vegetative buffers; develop and implement an erosion and sediment control plan; control access and movement of equipment; time activities to avoid sensitive periods of habitat use (e.g., spawning); schedule to minimize area and duration of soil exposure
	• changes in natural drainage, including elimination of streams, increased or decreased surface runoff; increased or decreased streamflows	• loss of fish habitat (e.g., water, spawning areas), loss of food organisms; changes in fish species composition and abundance; changes in wetland plant communities, channel erosion, change in geomorphology	• minimize changes in land contours and natural drainage; maintain streams (permanent and intermittent) and timing and quantity of flows
	• changes in soil moisture and species composition of vegetation	• loss of important wildlife species or habitat	• minimize vegetation removal and changes in land contours and natural drainage
	• disturbance of wildlife, particularly sensitive species	• reduced number of species or reduced abundance of a species	• identify sensitive species prior to the work; design grading to avoid disturbance of sensitive species; conduct work at a time that is least disturbing to sensitive species
	• alteration or destruction of landforms composed of unconsolidated materials (e.g., kames, eskers, sand dunes)	• loss of earth science ANSI, valleyland, etc.	• avoid grading of areas containing significant landform features
3. Aggregate Extraction	• alteration or destruction of landforms	• alteration to subsurface flow regime	• minimize extraction in sensitive head water areas
	• increased erosion, sedimentation and turbidity; increased inputs of nutrients and contaminants to water bodies and wetlands	• decreased photosynthesis, loss of productivity, loss of fish habitat, loss of food organisms, avoidance by fish, lethal or sublethal toxic effects on aquatic life; changes in fish species composition and	• maintain vegetative buffers; develop and implement an erosion and sediment control plan; control access and movement of equipment; time activities to avoid sensitive periods of habitat use

ATTACHMENT C.3

Examples of Potential Development Impacts and Mitigation

Development Activity	Potential Physical Impacts	Potential Impacts on Functions and Features	Examples of Some Possible Mitigation and Avoidance Techniques
		abundance; changes in wetland plant communities	(e.g., spawning); schedule to minimize area and duration of soil exposure.
	• changes in natural drainage, including altered surface runoff; altered streamflows	• loss of fish habitat (e.g., water, spawning areas), loss of food organisms; changes in fish species composition and abundance; changes in wetland plant communities, channel erosion, change in geomorphology	• minimize changes in land contours and natural drainage; maintain streams (permanent and intermittent) and timing and quantity of flows.
	• changes in soil moisture and species composition of vegetation	• loss of important wildlife species or habitat	• minimize vegetation removal and changes in land contours and natural drainage
	• disturbance of wildlife, particularly sensitive species	• reduced number of species or reduced abundance of a species	• identify sensitive species prior to the work, design work to avoid disturbance of sensitive species; conduct work at a time that is least disturbing to sensitive species
4. Installation of Services and Utilities (e.g., water sewers, hydro, stormwater management facilities)	• increased erosion, sedimentation, turbidity; increased inputs of nutrients and contaminants to water bodies	• decreased photosynthesis, loss of productivity, loss of fish habitat, loss of food organisms, avoidance by fish; changes in fish species composition and abundance	• maintain vegetative buffers; develop and implement an erosion and sediment control plan; time activities to avoid sensitive periods of habitat use; re-establish vegetation as soon as possible
	• disturbance of wildlife, particularly sensitive species	• reduced abundance of species	• identify sensitive species prior to the work, conduct work at a time that is least disturbing to sensitive species
	• alteration of identified, significant rock types, fossil assemblages or landforms by tunnelling or blasting	• loss of significant earth science values	• identify and avoid significant earth science features when planning and installing services • minimize the amount of disturbance
	• hydrological changes (e.g., changes in water levels as a result of re-routed water flow)	• changes in vegetative communities and fish and wildlife assemblages, reduction in groundwater recharge	• conduct appropriate studies to determine how to maintain existing hydrological regime; design underground facilities to minimize impacts on groundwater flows (seepage collars, orientation and depth of

ATTACHMENT C.3

Examples of Potential Development Impacts and Mitigation

Development Activity	Potential Physical Impacts	Potential Impacts on Functions and Features	Examples of Some Possible Mitigation and Avoidance Techniques
			trenches, etc.)
	• fragmentation of natural areas	• corridors through wetlands fragment habitat; reduce or eliminate forest-interior species; increased nest predation and parasitism; introduction of non-native species	• avoid forest fragmentation; if services must go through forests, route the corridor through edges instead of the interior.
CONSTRUCTION			
1. Building Construction	• increased erosion, sedimentation and turbidity; increased inputs of nutrients to water bodies and wetlands	• decreased photosynthesis, changes in productivity, loss of fish habitat, loss of food organisms, avoidance by fish; changes in fish species composition and abundance; loss of stream channel stability; changes in plant communities	• maintain vegetative buffers; control erosion, sedimentation and nutrient inputs through use of best Management Practices
	• water contamination by oils, gasoline, grease and other materials	• lethal or sublethal toxic effects on aquatic life and vegetation	• control water contamination through good housekeeping practices
	• increase in impervious surfaces; increased surface runoff, reduced infiltration and groundwater discharge; reduced stream baseflows and upwelling; loss of vegetation resulting in increased water temperatures	• loss of fish habitat (e.g., water, spawning areas for brook trout); changes in fish species composition and abundance; changes in wetland vegetation communities; drying of wetlands	• maintain or provide vegetative buffers; control quantity and quality of stormwater discharge using BMPs
	• loss of vegetation	• loss or fragmentation of wildlife habitat; loss of biodiversity • introduction of non-native species of plants and wildlife; increased predation and parasitism on native wildlife	• maintain a buffer between buildings and significant wildlife habitats; cluster housing as much as possible to avoid habitat fragmentation; ensure a threshold level of habitat is maintained for sensitive wildlife species (e.g., forest-interior species) • ensure that important animal movement corridors are not lost; develop alternate corridors, cover, etc. where possible

ATTACHMENT C.3

Examples of Potential Development Impacts and Mitigation

Development Activity	Potential Physical Impacts	Potential Impacts on Functions and Features	Examples of Some Possible Mitigation and Avoidance Techniques
	• disturbance of wildlife • loss of wildlife (e.g., mortality due to collisions with buildings)	• avoidance of the area by wildlife species	• identify species sensitive to disturbance and time construction to avoid periods of habitat use • appropriate building design to prevent / minimize mortality
2. Water Crossings (roads)	• realignment of stream channel; changes in water velocity	• barrier to fish movement may be created; may create downstream erosion or sediment deposition; separation of stream from floodplain	• maintain existing stream channel; use bridges to span stream; time construction to avoid sensitive periods of habitat use (e.g., spawning)
	• increased erosion, sedimentation and turbidity	• decreased photosynthesis, changes in productivity, loss of fish habitat, loss of food organisms, avoidance by fish; changes in fish species composition and abundance; changes in wetland vegetation	• minimize width of right-of-way; develop and implement an erosion and sediment control plan
	• loss of riparian vegetation	• loss of habitat for certain wildlife species (e.g., loons, ducks, reptiles and amphibians); water temperature may exceed tolerance of cold and cool water fish species	• minimize width of right-of-way; time construction to avoid sensitive periods of habitat use (e.g., nesting, spawning); replant vegetation
	• impediment of lateral flows in wetlands	• significant alterations in wetland vegetation communities; potential change of wetland type; changes in wildlife populations	• install adequate culverts and gravel base to maintain flow of surface water and shallow groundwater
	• attraction of nesting turtles and other wildlife to roadsides and roads	• mortality due to roadkill	• build roadside wings to keep turtles off roads; build underpasses with funnel fencing to direct turtles and other wildlife; develop alternate egg laying sites
	• pollutants from road	• heavy metals, oils and grease from vehicles	• collect and treat road runoff in stormwater management facilities
3. Paving	• increase in impervious surfaces; increased	• loss of fish habitat (e.g., water	• minimize area of paved surfaces; design

ATTACH[illegible]NT C.3

Examples of Potential Development Impacts and Mitigation

Development Activity	Potential Physical Impacts	Potential Impacts on Functions and Features	Examples of Some Possible Mitigation and Avoidance Techniques
	surface runoff and stream peak flows; reduced infiltration, baseflows and upwelling	upwelling/spawning areas for brook trout); changes in fish species composition and abundance; changes in wetland vegetation communities	roads without curbs, gutters and sidewalks to promote infiltration; maintain or provide vegetative buffers; control quantity and quality of stormwater using BMPs
	• increased erosion, sedimentation and turbidity from increased peak flows; increased inputs of nutrients and contaminants to water bodies and wetlands	• loss of fish habitat; lethal or sublethal toxic effects on aquatic life; changes in wetland vegetation communities and productivity	
	• increased water temperatures	• loss of cold and cool water fish species, where water temperatures exceed their tolerances	
	• loss of wildlife habitat • barrier to wildlife movement • wildlife mortality on roads	• same as for vegetation removal and construction of buildings (wildlife habitat) • some small mammals may not cross paved surfaces • paved surfaces which intersect movement corridors can cause high mortality	• same as for vegetation removal and construction of buildings (wildlife habitat) • extend bridges beyond watercourse shorelines to allow wildlife passage • avoid intersecting wildlife migration routes wherever possible; funnel wildlife through culverts
ACTIVITIES ASSOCIATED WITH DEVELOPMENT			
1. Groundwater Taking	• reduced groundwater discharge, reduced stream baseflows and upwelling; increased water temperatures	• loss of fish habitat (e.g., water, spawning areas for brook trout); changes in fish species composition and abundance; changes in wetland hydrology and vegetation communities • loss of moisture-sensitive vegetation communities and species which depend on them	• control rate and timing of water pumping; control lawn watering; pump from deep wells to infiltration galleries adjacent to water bodies or wetlands
2. Use of Septic Systems	• increased inputs of nutrients and	• loss of fish habitat (e.g., reduced oxygen in	• make alternative servicing arrangements or

ATTACHMENT C.3

Examples of Potential Development Impacts and Mitigation

Development Activity	Potential Physical Impacts	Potential Impacts on Functions and Features	Examples of Some Possible Mitigation and Avoidance Techniques
	contaminants to water bodies and wetlands; increased algal growth, reduced oxygen levels	deep portions of lake trout lakes); lethal or sublethal toxic effects on aquatic life; changes in fish species composition and abundance; changes in wetland vegetation communities and productivity; loss of waterfowl species	use alternative nutrient removal technologies approved by MOEE
	• faulty systems may adversely affect vegetation	• loss of vegetation can de-stabilize vegetation or landforms	• avoid installing system near sensitive vegetation or landforms
3. Human Occupation	• increased inputs of nutrients and contaminants to water bodies and wetlands from use of fertilizers, pesticides, etc.	• increased productivity, increased algal growth, reduced oxygen levels; lethal or sublethal toxic effects on aquatic life and wildlife species	• avoid use of fertilizers and other chemicals in shoreline or riparian areas; maintain or provide vegetative buffers
	• trampling of vegetation and soil compaction; increased erosion sedimentation and turbidity	• loss of fish habitat and food organisms; changes in fish species composition and abundance	• minimize erosion by using gravel, stones or wood or paths; fencing or other deterrents to human
	• removal of vegetation; changes in vegetation structure and composition	• loss of wildlife habitat; reduced number of wildlife; loss of species, reduced biodiversity	• cluster housing so people are concentrated and less habitat is disturbed
	• increased predation on wildlife by pets; introduction of non-native plants (e.g., purple loosestrife); invasion by predators, parasites and competitive species	• reduced numbers of wildlife; loss of species; reduced biodiversity and wildlife reproductive success	• public education/awareness may help over the long term
4. Recreation (e.g., walking, swimming, boating, fishing, hunting and use of all terrain vehicles)	• increase in shoreline alterations (e.g., dredging, docks, beach creation) to support recreational use; removal of aquatic vegetation, logs, etc.; increased erosion, sedimentation and turbidity	• changes in productivity, loss of fish habitat (e.g., nursery) and food organisms by shoreline alterations and covering substrate; changes in fish species composition and abundance	• choose designs (e.g., floating docks) and materials which will minimize impacts
	• trampling of vegetation, damage to root mat, soil disturbance; introduction of invasive, non-native plant species	• loss of wildlife habitat	• develop trails for walking and trailbikes that direct people away from sensitive habitats
	• disturbance of wildlife, especially during	• loss of wildlife species and reduced numbers	• restrict some areas for ATVs; education

ATTACHMENT C.3

Examples of Potential Development Impacts and Mitigation

Development Activity	Potential Physical Impacts	Potential Impacts on Functions and Features	Examples of Some Possible Mitigation and Avoidance Techniques
	critical periods	of wildlife	
	• attraction of some wildlife species (e.g., bird feeding)	• increased numbers of some species; increase in nuisance species (e.g., squirrels)	• educate the public about attracting nuisance species
	• reduced opportunities for hunting and trapping in developed areas; increase in deer-vehicle accidents	• increase in nuisance species (e.g., racoons, deer)	
	• increased harvest of fish	• reduced numbers of fish	• comply with fishing regulations; exercise stewardship
	• trampling of sensitive life science or earth science features (e.g., sand dunes)	• loss of all or part of sensitive feature or area	• locate development away from sensitive feature or area
	• access to sensitive sites (fossil and mineral localities)	• site stress from vandalism; loss of integrity	• route recreation away from feature

ATTACHMENT C.4

Sample Checklist for Site-Specific Assessments of Development Impacts

1. LOCATION

PROJECT: _____
(refers to entire property to be developed)

PROPONENT _____ PROPONENT'S SIGNATURE _____

LOT _____ CONC. _____ MUNICIPALITY (Geographic Twp.) _____

Is the project located within a significant natural heritage area or feature? (Y/N____)
Is the project located adjacent to a significant natural heritage area or feature? (Y/N____)

If Yes, what type of feature or area is it? (E.g., wetland; woodland) _____

2. CHARACTERISTICS OF THE PROPOSED DEVELOPMENT AREA

a. SLOPE: Flat (0-10%) _____ Moderate (10-30%) ____
Steep (30%+) _____ Hilly _____

b. SOIL DEPTH (to bedrock): Shallow (0-30cm) ___
Moderate (30-60cm) ____ Deep (60+cm) _____

c. SOIL TYPE (texture): Rock/gravel ____ Sand ____ Loam ____
Clay ____ Organic ____ Mixed _____

d. GENERAL VEGETATION:
_____
_____
_____

e. Are septic beds proposed? (also indicate on sketch): (Y/N_____)

f. Does water on site flow to or from a natural heritage area or feature?
(also indicate on sketch)
Surface water (Y/N_____) Groundwater (Y/N_____)

g. Please list the key features and functions of the natural heritage area
(You may wish to refer to the appropriate section(s) in Section 2 or Attachment C.3)
_____
_____
_____
_____

3. POTENTIAL IMPACTS ON NATURAL HERITAGE AREAS, FEATURES AND FUNCTIONS. List all potential impacts. You may wish to refer to Attachment C.3.
_____
_____
_____
_____

4. DESCRIPTION OF SITE (total area for which the project is proposed)

- applicant to attach a sketch of the proposed project
- illustrate the property in relation to natural heritage areas and features including distances (measured or paced)
- show the location of: streams, springs, wells (existing and proposed), main vegetation communities, proposed building sites, septic bed, parking areas, plus any work proposed such as filling or excavation

5. PLANNING AUTHORITY REVIEW

Name of Natural Heritage Area (if applicable)

_____

a. Impacts

Does the checklist accurately describe impacts?

_____
_____
_____
_____

Will the proposed development have adverse impacts on key functions or features?

_____
_____
_____
_____

b. Is additional information or study required? (Y/N ___) If yes, please specify.

_____
_____
_____
_____

c. The project is acceptable with the following conditions:

_____
_____
_____
_____

d. The project is unacceptable for the following reasons:

_____
_____
_____
_____

Reviewer or Designate: _____

Agency, Organization or Other Affiliation: _____
Signature: _____
Date: _____

APPENDIX D

GLOSSARY OF TERMS

Glossary of Terms

(Note: Italicized definitions are from the Provincial Policy Statement)

Adjacent lands -- ***Means those lands, contiguous to a specific natural heritage feature or area, where it is likely that development or site alteration would have a negative impact on the feature or area. The extent of the adjacent lands may be recommended by the Province or based on municipal approaches which achieve the same objectives.***

Anaerobic – The condition associated with the lack of free oxygen in an environment.

Aquatic Linkage -- Aquatic ecosystem components which perform their functions in concert with each other.

Best Professional Judgement -- Decision-making tool involving the use of professional experience where better definitive technical information does not exist.

Biodiversity -- Biodiversity is the variability among organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Corridor -- The naturally vegetated or potential revegetated areas that link or border natural areas and provide ecological functions such as habitat, passage, hydrological flow, connection or buffering from adjacent impacts. They can occur across or along uplands, lowlands or slopes. Ravine, valley, river and stream corridors are further defined as landform depressions, usually with water flowing through or standing in them for some period of the year.

Cumulative Impacts -- The sum of all individual impacts occurring over space and time, including those of the foreseeable future.

Development -- ***means the creation of a new lot, a change of land use, or the construction of buildings and structures, requiring approval under the Planning Act; but does not include activities that create or maintain infrastructure authorized under an environmental assessment process; or works subject to the Drainage Act.***

Drainage Basin -- An area occupied by a closed drainage system, especially a region that collects surface runoff and contributes it to a stream channel, lake or other body of water. Also known as catchment or watershed. Divisions of this basin are known as subcatchments or subwatersheds.

Ecological functions -- ***means the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions.***

Ecological site district -- An ecological site district is a subdivision of a site region based on a characteristic pattern of physiographic features which set apart fairly large areas from one another.

Ecological site region -- An ecological site region is an area of land within which the response of vegetation to the features of the landform follows a consistent pattern. Each specific type of land (defined in terms of relief, texture and petrography of geologic materials, depth of bedrock and drainage conditions) within a specific region has its characteristic plant succession. Since an

ecological site region is the integration of all the landscape features within a prescribed area, it can be best defined as a region of potential biological productivity.

Ecosystem -- Any area with a boundary through which the input and output of energy and materials can be measured and related to some unifying factor, and includes the living and non-living environment together with the population or community; or systems of plants, animals and microorganisms, together with the non-living components of their environment, related ecological processes and humans.

Evaluation System -- A system used to rate the values of wetlands and determine their relative importance by measuring a number of indicative features, such as biological, hydrological, social and special features, and approved for use in a region of Ontario by the Ministry of Natural Resources.

Fish Habitat -- ***means the spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes.***

Food Chain -- The transfer of food, energy and nutrients through living organisms, from one trophic level to another.

Function -- see ecological function above

Guilds -- Species which are grouped together because of common strategies and/or use of areas for life cycle stages.

Hydric Soil -- Soil that is saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions that favour the growth and regeneration of hydrophytic vegetation.

Hydrophytic Vegetation -- Any plant growing in water on a substrate that is at least periodically anaerobic or low in oxygen, as a result of high water content.

Indigenous -- Species which have originated naturally in a particular region or environment.

Key Function -- A function which is measurable and contributes significantly to the integrity of an ecosystem, the loss of which would have a significant impact on a natural heritage area.

LANDSAT -- A series of satellites, originally called ERTS (Earth Resources Technology Satellites), used in remote sensing studies. In 1975, the ERTS program was renamed "LANDSAT" to distinguish it from another program, "SEASAT", which focuses on ocean studies.

Mitigation -- Includes the prevention, modification or alleviation of impacts on the natural environment. Also includes any action with the intent to enhance beneficial effects.

Natural heritage features and areas -- ***means features and areas such as significant wetlands, fish habitat, significant woodlands south and east of the Canadian Shield, significant valleylands south and east of the Canadian Shield, significant portions of the habitat of endangered and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area.***

Negative Impact -- ***means:***

- ***in regard to fish habitat, the harmful alteration, disruption or destruction of fish habitat, except where it has been authorized under the Fisheries Act using the guiding principle of no net loss of productive capacity***
- ***in regard to other natural heritage features and areas, the loss of the natural features or ecological functions for which an area is identified.***

Patch Dynamics -- Physical, chemical and biological interactions between irregularly-shaped ecosystems which occur within the broader landscape.

Rehabilitation -- To restore the ecosystem to a higher functioning condition.

Sensitivity Assessment -- Assessment of the degree and spatial extent of functions to determine their sensitivity to impacts from various land use activities.

Significant -- ***means:***

- ***in regard to wetlands and areas of natural and scientific interest, an area identified as provincially significant by the Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time.***
- ***in regard to other features and areas in Policy 2.3, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system. Criteria for determining significance may be recommended by the Province, but municipal approaches that achieve the same objective may also be used.***
- ***in regard to other matters, important in terms of amount, content, representation or effect.***

Site Alteration -- ***Means activities, such as fill, grading and excavation, that would change the landform and natural vegetative characteristics of a site.***

Stratigraphy -- Study of the order and relative position of the layers (strata) of the earth.

Trophic Levels -- An organism's feeding status in the movement of food energy through an ecosystem. Feeding status is determined by the organism's prey and predators.

Vulnerable Species -- Any indigenous species of flora or fauna that is represented in Ontario by small but relatively stable populations, and/or that occurs sporadically, or in a very restricted area of Ontario, or at the fringe of its range; vulnerable species as defined by OMNR, the Committee on the Status of Species-At-Risk in Ontario (COSSARO) or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Wetland Types -- The individual wetland ecosystems that have relatively similar vegetation and environmental characteristics, which are commonly called marshes, swamps, bogs and fens.